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SPONGES

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(Plates XLVIII–LVII, text-figs. 1–56)

INTRODUCTION

This report is based on the study of material collected by the R.R.S. 'Discovery', the R.S.S. 'William Scoresby' and the staff of the Marine Biological Station at South Georgia during the years 1925–9. In many respects the collections obtained are of unusual interest, including as they do specimens from the West African coast and from the area around Tristan da Cunha, for our knowledge of the sponge faunas of these two localities is as yet meagre. The rest of the material was obtained mainly from South Georgia, South Shetlands, the Falkland Islands and the extreme southern part of the South American continent.

The sponges in these collections are abundant and well preserved and include representatives of 168 species and varieties, of which only 35 are new: but the more important feature of the collection is the fact that many of the species are each represented by numerous individuals. Five species of *Tedania*, for example, are represented by nearly 200 specimens of all sizes. When abundant material is to hand for comparative study, it is always found that the prevailing ideas concerning the species in question require radical revision. It has been possible to show here that the variations in *T. massa*, Ridley and Dendy, go far beyond what might *a priori* have been expected. Moreover, the extremes of fluctuation in the dimensions of the spicules, within a given species, are considerably wider apart than has hitherto been thought to be the case. This is strikingly demonstrated in *Iophon chelifer*, Ridley and Dendy, in which species again considerable quantities of material are available.

In addition to the usual systematic studies, a certain amount of data is made available from the identification of the Discovery collections concerning the development and the breeding seasons of Antarctic species, and our knowledge of the distribution of species in the South Atlantic and Antarctic is considerably increased.

SYSTEMATIC LIST OF SPECIES

Sub-kingdom PARAZOA

Phylum NUDA

Order HEXACTINELLIDA

Family ROSSELLIDAE

Genus *Rossella*, Carter.
R. antarctica, var. ***intermedia***, n.
R. nuda, Topsent.
R. racovitzae, Topsent.
R. villosa, Burton.
Genus *Gymnorossella*, Topsent.
G. inermis, Topsent.

Phylum GELATINOSA

Order CALCAREA

Family HOMOCOELIDAE

Genus *Leucosolenia*, Bowerbank.
L. macleayi (Lendenfeld).
L. discovereyi, Jenkin.

Family LEUCASCIDAE

Genus *Pericharax*, Poléjaeff.
P. pyriformis, sp.n.

Genus *Leucetta*, Haeckel.
L. leptoraphis (Jenkin).
L. macquariensis, Dendy.

Family LEUCALTIDAE

Genus *Leucaltis*, Haeckel.
L. gastrorhabdifera, sp.n.

Genus *Leucettusa*, Haeckel.
L. haeckeliana (Poléjaeff).
L. simplicissima, sp.n.

Family GRANTIIDAE

Genus *Grantia*, Fleming.
G. cirrata, var. *aurorae*, Dendy.
G. cirrata, var. ***tenuipilosa***, n.

Order TETRAXONIDA

Sub-order *HOMOSCLEROPHORA*

Family PLAKINIDAE

Genus *Plakina*, Schulze.
P. monolopha, Schulze.
P. trilopha, Schulze.

Sub-order *STREPTASTROSCLEROPHORA*

Family PACHASTRELLIDAE

Genus *Pachastrella*, Schmidt.
P. monilifera, Schmidt.

Genus *Poecillastra*, Sollas.
P. compressa (Bowerbank).

Sub-order *ASTROSCLEROPHORA*

Family GEODIIDAE

Genus *Geodia*, Lamarck.
G. magellani (Sollas).

Family ERYLIDAE

Genus *Erylus*, Gray.
E. discophorus (Schmidt).

Sub-order *SIGMATOSCLEROPHORA*

Family TETILLIDAE

Genus *Tetilla*, Schmidt.
T. leptoderma (Sollas).

Genus *Cinachyra*, Sollas.
C. antarctica (Carter).
C. barbata, Sollas.
C. coactifera (Lendenfeld).

Family HAPLOSCLERIDAE

Genus *Haliclona*, Grant.
H. nodosa (Thiele).
H. chilensis (Thiele).
H. variabilis (Thiele).
H. penicillata (Topsent).
H. gaussiana (Hentschel).
H. tubuloramosa (Dendy).
H. conica (Brondsted).
H. bilamellata, sp.n.
H. stephensi, sp.n.
H. petrosioides, sp.n.
Genus ***Haliclonissa***, gen.n.
H. verrucosa, sp.n.
H. sacciformis, sp.n.
Genus *Microxina*, Topsent.
M. benedeni (Topsent).
Genus ***Hemigellius***, gen.n.
H. rudis (Topsent).
H. pachyderma, sp.n.
Genus *Adocia*, Gray.
A. carduus (Ridley and Dendy).
A. glacialis (Ridley and Dendy).
A. siphonella (Thiele).
A. cucurbitiformis (Kirkpatrick).
A. tremulus (Topsent).
A. tenellus (Topsent).
Genus *Calyx*, Vosmaer.
C. arcuarius (Topsent).
C. kerguelensis (Hentschel).
Genus *Dasychalina*, Ridley and Dendy.
D. validissima (Thiele).
Genus *Callyspongia*, Duchaissang and Michelotti.
C. fortis (Ridley).
C. fusifera (Thiele).
C. flabellata, sp.n.
Genus *Phloeodictyon*, Carter.
P. eumitum, Kirkpatrick.

Family DESMACIDONIDAE

Section Isodictyeae.
Genus *Isodictya*, Bowerbank.
I. kerguelensis (Ridley and Dendy).
I. kerguelensis, var. *simillima* (Hentschel).
I. setifer (Topsent).
I. delicata (Thiele).
I. antarctica (Kirkpatrick).
I. cactoides (Kirkpatrick).
I. microchela (Topsent).
I. erinacea (Topsent).
I. toxophila, sp.n.
Genus *Guitarra*, Carter.
G. fimbriata, Carter.
Genus *Cercidochela*, Kirkpatrick.
C. lankesteri, Kirkpatrick.
Genus *Plumocolumella*, Burton.
P. macandrina (Kirkpatrick).
P. myxillioides, sp.n.
Section Mycaleae.
Genus *Mycale*, Gray.
M. magellanica (Ridley).
M. lapidiformis (Ridley and Dendy).
M. acerata, Kirkpatrick.
M. tridens, Hentschel.
M. macrochela, sp.n.
Genus *Amphilectus*, Vosmaer.
A. fucorum (Esper).
A. rugosa (Thiele).
A. flabellata, sp.n.
Genus *Biemna*, Gray.
B. chilensis, Thiele.
Genus *Asbestopluma*, Norman.
A. calyx, Hentschel.
Genus *Arenochalina*, Lendenfeld.
A. incrustans, sp.n.
Genus *Acanthorhabdus*, Burton.
A. fragilis, Burton.
Genus ***Sigmotylotella***, gen.n.
S. suberitoides, sp.n.
Section Iophoneae.
Genus *Iophon*, Gray.
I. radiatus, Topsent.
I. proximum (Ridley).
Section Tedanieae.
Genus *Tedania*, Gray.
T. tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
T. spinata (Ridley).
T. charcoti, Topsent.
T. murdochi, Topsent.
T. oxeata, Topsent.
Section Myxilleae.
Genus *Myxilla*, Schmidt.
M. mollis, Ridley and Dendy.
M. australis (Topsent).
M. asigmata, Topsent.
M. chilensis, Thiele.
M. elongata, Topsent.
M. basimucronata, sp.n.
M. verrucosa, sp.n.

Section MYXILLEAE (*continued*)
Genus *Ectyodoryx*, Lundbeck.
E. paupertas, subsp. *nobile* (Ridley and Dendy).
E. antarctica (Hentschel).
E. frondosa, var. *anacantha*, Hentschel.
E. ramilobosa (Topsent).
Genus *Anchinoë*, Gray.
A. latrunculioides (Ridley and Dendy).
A. areolata (Thiele).
A. leptochela (Hentschel).
Genus *Stelodoryx*, Topsent.
S. pluridentata (Lundbeck).
S. discovereyi, sp.n.
Genus *Kirkpatrickia*, Topsent.
K. variolosa (Kirkpatrick).
K. coulmani (Kirkpatrick).
Genus *Acheliderma*, Topsent.
A. topsenti, sp.n.
Genus *Inflatella*, Schmidt.
I. belli (Kirkpatrick).
Section PLOCAMIEAE.
Genus *Plocamia*, Schmidt.
P. gaussiana, Hentschel.
Section CLATHRIEAE.
Genus *Clathria*, Schmidt.
C. papillosa, Thiele.
C. toxipraedita, Topsent.
C. lipochela, sp.n.
Genus *Rhaphidophlus*, Ehlers.
R. paucispiculus, sp.n.
Genus ***Protoclathria***, gen.n.
P. simplicissima, sp.n.
Genus *Ophlitaspongia*, Bowerbank.
O. membranacea, Thiele.
O. thielei, sp.n.
Genus *Artemisina*, Vosmaer.
A. apollinis (Ridley and Dendy).
A. plumosa, Hentschel.
Genus *Dictyociona*, Topsent.
D. discreta (Thiele).
D. terrae-novae (Dendy).
Genus *Axociella*, Hallmann.
A. nidificata (Kirkpatrick).
A. flabellata (Topsent).
Genus *Pseudanchinoë*, Burton.
P. toxifera (Topsent).
Genus *Eurypon*, Gray.
E. miniaceum, Thiele.
Genus *Stylotellopsis*, Thiele.
S. amabilis, Thiele.
Genus *Raspaxilla*, Topsent.
R. phakellina, Topsent.
Section HYMEDESMIEAE.
Genus *Hymedesmia*, Bowerbank.
H. irritans, Thiele.
H. laevis, Thiele.
H. simillima, var. *antarctica*, Hentschel.
H. longurioides, sp.n.
Section CRELLEAE.
Genus *Crella*, Gray.
C. crassa (Hentschel).
Genus *Crellina*, Hentschel.
C. tubifex, Hentschel.

Family AXINELLIDAE

Genus *Hymeniacidon*, Bowerbank.
H. caruncula, Bowerbank.
H. sanguinea (Grant).
H. fernandezi, Thiele.
H. torquata, Topsent.
H. dubia, sp.n.
Genus ***Thieleia***, gen.n.
T. rubiginosa (Thiele).
Genus *Axinella*, Schmidt.
A. crinita, Thiele.
Genus *Pseudaxinella*, Thiele.
P. egregia (Ridley).
Genus *Homaxinella*, Topsent.
H. supratumescens (Topsent).
Genus *Rhizaxinella*, Keller.
R. australiensis, Hentschel.
Genus *Stylohalina*, Kirk.
S. hirta (Topsent).
Genus ***Plicatellopsis***, gen.n.
P. arborescens, sp.n.
P. flabellata, sp.n.
Genus *Bubaris*, Gray.
B. vermiculata (Bowerbank).
B. murrayi, Topsent.
Genus *Ceratopsis*, Thiele.
C. incrustans, sp.n.
Genus *Eumastia*, Schmidt.
E. attenuata, Topsent.

Family CLAVULIDAE

Genus *Suberites*, Nardo.
S. montiniger, Carter.
S. microstomus, var. *stellatus*, Kirkpatrick.
S. papillatus, Kirkpatrick.

Genus *Pseudosuberites*, Topsent.
P. hyalinus (Ridley and Dendy).
P. sulcatus, Thiele.
Genus *Tentorium*, Vosmaer.
T. semisuberites (Schmidt).
Genus *Polymastia*, Bowerbank.
P. isidis, Thiele.
P. invaginata, Kirkpatrick.
Genus *Sphaerotylus*, Topsent.
S. antarcticus, Kirkpatrick.
Genus *Stylocordyla*, Thomson.
S. borealis, subsp. *acuata*, Kirkpatrick.
Genus *Spirastrella*, Schmidt.
S. purpurea (Lamarck).
Genus *Latrunculia*, Bocage.
L. lendenfeldi, Hentschel.
Genus *Cliona*, Grant.
C. aethiopicus, sp.n.

Order EUCERATOSA

Genus *Halisarca*, Dujardin.
H. dujardini, var. *magellanica*, Topsent.
Genus *Spongia*, Linnaeus.
S. officinalis, Linnaeus.
S. magellanica, Thiele.
Genus *Duseideia*, Johnston.
D. fragilis (Montagu).
D. chilensis (Thiele).
D. tenuifibra, sp.n.
Genus *Dendrilla*, Lendenfeld.
D. membranosa (Pallas).

LIST OF STATIONS: WITH THE NAMES OF SPECIES COLLECTED AT EACH

R.R.S. 'DISCOVERY'

St. 1. 16. xi. 25. Clarence Bay, Ascension Island, 7° 55′ 15″ S, 14° 25′ W. Rectangular net, coralline sand and shell, 16–27 m.

Spongia officinalis, Linnaeus.
Duseideia fragilis (Montagu).

St. 2. 17. ix. 25. Clarence Bay, Ascension Island, Catherine's Point and Collyer Point. Shore collecting.

Arenochalina incrustans, sp.n.

St. 6. 1. ii. 25. Tristan da Cunha, 3 miles N 30° E of Settlement. Large dredge, rock, 80–140 m.

Leucosolenia macleayi (Lendenfeld).
Leucaltis gastrorhabdifera, sp.n.
Plakina monolopha, Schulze.
Pachastrella monilifera, Schmidt.
Poecillastra compressa (Bowerbank).
Erylus discophorus (Schmidt).
Haliclona petrosioides, sp.n.
Adocia siphonella (Thiele).
Phloeodictyon eumitum, Kirkpatrick.
Amphilectus fucorum (Esper).
A. rugosus (Thiele).
Sigmotylotella suberitoides, sp.n.
Iophon proximum (Ridley).
Protoclathria simplicissima, sp.n.
Hymedesmia irritans, Thiele.
Hymeniacidon torquata, Topsent.
Pseudaxinella egregia (Ridley).
Bubaris vermiculata (Bowerbank).
B. murrayi, Topsent.
Ceratopsis incrustans, sp.n.
Pseudosuberites hyalinus (Ridley and Dendy).
Tentorium semisuberites (Schmidt).

St. 27. 15. iii. 26. West Cumberland Bay, South Georgia, 3·3 miles S 44° E of Jason Light. Large dredge, rock, 110 m.

Cinachyra barbata, Sollas.
Plumocolumella maeandrina (Kirkpatrick).

St. 39. 25. iii. 26. East Cumberland Bay, South Georgia, from 8 cables S 81° W of Merton Rock to 1·3 miles N 7° E of Macmahon Rock. Otter trawl, grey mud, 179–235 m.

Rossella nuda, Topsent.
Leucetta leptoraphis (Jenkin).
Tetilla leptoderma (Sollas).
Cinachyra coactifera (Lendenfeld).
Microxina benedeni (Topsent).
Hemigellius rudis (Topsent).
Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
I. cactoides (Kirkpatrick).
I. toxophila, sp.n.
Guitarra fimbriata, Carter.
Iophon proximum (Ridley).
Tedania charcoti, Topsent.

St. 42. 1. iv. 26. Off mouth of Cumberland Bay, South Georgia, from 6·3 miles N 89° E of Jason Light to 4 miles N 39° E of Jason Light. Otter trawl, 120–204 m.

Rossella antarctica, var. *intermedia*, n.
Leucetta leptoraphis (Jenkin).
Cinachyra antarctica (Carter).
C. barbata, Sollas.
Haliclona gaussiana (Hentschel).
Hemigellius rudis (Topsent).
Isodictya setifer (Topsent).
I. antarctica (Kirkpatrick).
Plumocolumella maeandrina (Kirkpatrick).
Mycale acerata, Kirkpatrick.
Amphilectus fucorum (Johnston).
Iophon proximum (Ridley).
Tedania massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.
M. basimucronata, sp.n.
Anchinoë leptochela (Thiele).
Kirkpatrickia coulmani (Kirkpatrick).
Plocamia gaussiana, Hentschel.
Ophlitaspongia thielei, sp.n.
Artemisina apollinis (Ridley and Dendy).
Polymastia invaginata, Kirkpatrick.
Stylocordyla borealis (Lovén), subsp. *acuata*, Kirkpatrick.

St. 45. 6. iv. 26. 2·7 miles S 85° E of Jason Light, South Georgia. Otter trawl, grey mud, 238–270 m.

Rossella nuda, Topsent.
Mycale acerata, Kirkpatrick.
Dendrilla membranosa (Pallas).

St. 51. 4. v. 26. Off Eddystone Rock, East Falkland Island, from 7 miles N 50° E to 7·6 miles N 63° E of Eddystone Rock. Otter trawl, fine sand, 105–115 m.

Dasychalina validissima (Thiele).
Amphilectus fucorum (Johnston).
Iophon proximum (Ridley).
Tedania spinata (Ridley).
Clathria lipochela, sp.n.

St. 53. 12. v. 26. Port Stanley, East Falkland Island, Hulk of 'Great Britain'. Mussel rake, 0–2 m.

Leucosolenia discoveryi, Jenkin.
Leucetta macquariensis, Dendy.
Grantia cirrata, var. *aurorae*, Dendy.
G. cirrata, var. *tenuipilosa*, n.
Haliclona variabilis (Thiele).
Dasychalina validissima (Thiele).
Mycale magellanica (Ridley).
Tedania murdochi, Topsent.
Hymeniacidon fernandezi, Thiele.
Eumastia attenuata, Topsent.

St. 55. 16. v. 26. Entrance to Port Stanley, East Falkland Island, 2 cables S 24° E of Navy Point. Small beam trawl, 10–16 m.

Leucetta macquariensis, Dendy.
Mycale magellanica (Ridley).
Halisarca dujardini, var. *magellanica*, Topsent.

St. 56. 16. v. 26. Sparrow Cove, Port William, East Falkland Island, $1\frac{1}{2}$ cables N 50° E of Sparrow Point. Small beam trawl, $10\frac{1}{2}$–16 m.

Leucetta macquariensis, Dendy.

St. 58. 19. v. 26. Port Stanley, East Falkland Island, on piles of Government Jetty.

Calyx kerguelensis (Hentschel).
Myxilla chilensis, Thiele.
Hymedesmia laevis, Thiele.
Pseudosuberites sulcatus, Thiele.
Halisarca dujardini, var. *magellanica*, Topsent.

St. 123. 15. xii. 26. Off mouth of Cumberland Bay, South Georgia. From 4·1 miles N 54° E of Larsen Point to 1·2 miles S 62° W of Merton Rock. Large otter trawl, grey mud, 230–250 m.

Rossella nuda, Topsent.
Cinachyra barbata, Sollas.
Isodictya cactoides (Kirkpatrick).
Plumocolumella maeandrina (Kirkpatrick).
Iophon radiatus, Topsent.
Myxilla mollis, Ridley and Dendy.
Stylocordyla borealis, subsp. *acuata* (Kirkpatrick).

St. 140. 23. xii. 26. Stromness Harbour to Larsen Point, South Georgia. From 54° 02′ S, 36° 38′ W to 54° 11′ 30″ S, 36° 29′ W. Large otter trawl, green mud and stones, 122–136 m.

Leucetta leptoraphis (Jenkin).
Placina trilopha, Schulze.
Tetilla leptoderma (Sollas).
Cinachyra barbata, Sollas.
Adocia glacialis (Ridley and Dendy).
Calyx kerguelensis (Hentschel).
Dasychalina validissima (Thiele).
Tedania charcoti, Topsent.
Axociella flabellata (Topsent).

St. 143. 30. xii. 26. Off mouth of East Cumberland Bay, South Georgia, 54° 12′ S, 36° 29′ 30″ W. Large otter trawl, mud, 273 m.

Isodictya setifer (Topsent).

St. 144. 5. i. 7. Off mouth of Stromness Harbour, South Georgia, from 54° 04′ S, 36° 27′ W to 53° 58′ S, 36° 26′ W. Large otter trawl, 4 mm. mesh, green mud and stones, 155–178 m.

Isodictya setifer (Topsent).
Clathria toxipraedita, Topsent.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 145. 7. i. 27. Stromness Harbour, South Georgia, between Grass Island and Tonsberg Point. Small beam trawl, 26–35 m.

Leucetta macquariensis, Dendy.
Haliclona nodosa (Thiele).
Iophon radiatus, Topsent.
Tedania charcoti, Topsent.
Myxilla asigmata, Topsent.
Hymeniacidon fernandezi, Thiele.

St. 146. 8. i. 27. South Georgia, 53° 48′ S, 35° 37′ 30″ W. Large dredge, 728 m.

Mycale magellanica (Ridley).
Tedania charcoti, Topsent.

St. 148. 9. i. 27. Off Cape Saunders, South Georgia, from 54° 03′ S, 36° 39′ W to 54° 05′ S, 36° 36′ 30″ W. Large otter trawl, grey mud and stones, 132–148 m.

Rossella nuda, Topsent.
Leucetta leptoraphis (Jenkin).
Tetilla leptoderma (Sollas).
Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
I. toxophila, sp.n.
Plumocolumella maeandrina (Kirkpatrick).
Plocamia gaussiana, Hentschel.
Tedania massa, Ridley and Dendy.
T. charcoti, Topsent.
Ophlitaspongia thielei, sp.n.
Axociella nidificata (Kirkpatrick).
Homaxinella supratumescens (Topsent).

St. 149. 10. i. 27. Mouth of East Cumberland Bay, South Georgia, from 1·15 miles N 76½° W to 2·62 miles S 11° W of Merton Rock. Large otter trawl, mud, 200–234 m.

Microxina benedeni (Topsent).
Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
Plumocolumella maeandrina (Kirkpatrick).
Kirkpatrickia variolosa (Kirkpatrick).
Axociella flabellata (Topsent).

St. 152. 17. i. 27. South Georgia, 53° 51′ 30″ S, 36° 18′ 30″ W. Large dredge, rock, 245 m.

Rossella antarctica, var. *intermedia*, n.
Plakina trilopha, Schulze.
Anchinoë areolata (Thiele).
Tedania massa, Ridley and Dendy.
T. charcoti, Topsent.
Ophlitaspongia membranacea, Thiele.
Pseudosuberites hyalinus (Ridley and Dendy).
Suberites microstomus, var. *stellatus*, Kirkpatrick.

St. 153. 17. i. 27. South Georgia, 54° 08′ 30″ S, 36° 27′ 30″ W. Large dredge, rock, 106 m.

Cinachyra barbata, Sollas.

St. 155. 18. i. 27. South Georgia, 4·1 miles S 26½° E of Larsen Point. Large otter trawl, mud, 260 m.

Isodictya antarctica (Kirkpatrick).

St. 156. 20. i. 27. South Georgia, 53° 51′ S, 36° 21′ 30″ W. Large dredge, rock, 200–236 m.

Rossella antarctica, var. *intermedia*, n.
Leucetta macquariensis (Dendy).
Asbestopluma calyx, Hentschel.
Tedania massa, Ridley and Dendy.
Anchinoë latrunculioides (Ridley and Dendy).
Ophlitaspongia thielei, sp.n.
Eurypon miniaceum, Thiele.
Suberites papillatus (Kirkpatrick).
Pseudosuberites sulcatus, Thiele.
Polymastia invaginata, Kirkpatrick.
Spongia magellanica, Thiele.

St. 157. 20. i. 27. South Georgia, 53° 51′ S, 36° 11′ 15″ W. Large dredge, diatom ooze, stones and fine sand, 970 m.

Iophon proximum (Ridley).
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Anchinoë areolata (Thiele).
Dictyociona terrae-novae (Dendy).
Thieleia rubiginosa (Thiele).
Pseudosuberites hyalinus (Ridley and Dendy).

St. 158. 21. i. 27. South Georgia, 53° 48′ 30″ S, 35° 57′ W. Large dredge, rock, 401–411 m.

Plumocolumella maeandrina (Kirkpatrick).
Tedania massa, Ridley and Dendy.
T. charcoti, Topsent.
Myxilla elongata, Topsent.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Rhizaxinella australiensis, Hentschel.

St. 159. 21. i. 27. South Georgia, 53° 52′ 30″ S, 36° 08′ W. Large dredge, rock, 160 m.

Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
Mycale acerata, Kirkpatrick.
Tedania massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
E. ramilobosa (Topsent).
Anchinoë latrunculioides (Ridley and Dendy).
A. leptochela (Thiele).
Plocamia gaussiana, Hentschel.

St. 160. 7. ii. 27. Near Shag Rocks, 53° 43′ 40″ S, 40° 57′ W. Large dredge, grey mud, stones and rock, 177 m.

Rossella racovitzae, Topsent.
Pericharax pyriformis, sp.n.
Adocia carduus (Ridley and Dendy).
Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
Amphilectus fucorum (Esper).
Tedania massa, Ridley and Dendy.
T. charcoti, Topsent.
Myxilla elongata, Topsent.
Ectyodoryx antarctica (Hentschel).
Anchinoë latrunculioides (Ridley and Dendy).
A. areolata (Thiele).
Acheliderma topsenti, sp.n.
Plocamia gaussiana, Hentschel.
Rhaphidophlus paucispiculus, sp.n.
Pseudanchinoë toxifera (Topsent).
Hymedesmia longurioides, sp.n.
Hymeniacidon fernandezi, Thiele.
Suberites papillatus, Kirkpatrick.
Sphaerotylus antarcticus, Kirkpatrick.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 163. 17. ii. 27. Paul Harbour, Signy Island, South Orkneys. Small beam trawl, 18–27 m.

Calyx arcuarius (Topsent).

St. 164. 18. ii. 27. East end of Normanna Strait, South Orkneys, near Cape Hansen, Coronation Island. Small beam trawl, 24–36 m.

Mycale acerata, Kirkpatrick.

St. 167. 20. ii. 27. Off Signy Island, South Orkneys, 60° 50′ 30″ S, 46° 15′ W. Large otter trawl, 7 mm. mesh, green mud, 244–344 m.

Polymastia invaginata, Kirkpatrick.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 170. 23. ii. 27. Off Cape Bowles, Clarence Island, 61° 25′ 30″ S, 53° 46′ W. Large dredge, rock, 342 m.

Tetilla leptoderma (Sollas).
Cinachyra barbata (Sollas).
Hemigellius rudis (Topsent).
Mycale tridens, Hentschel.
M. macrochela, sp.n.
Acanthorhabdus fragilis, Burton.
Iophon radiatus, Topsent.
T. oxeata, Topsent.
Suberites papillatus, Kirkpatrick.

St. 175. 2. iii. 27. Bransfield Strait, South Shetlands, 63° 17′ 20″ S, 59° 48′ 15″ W. Large dredge, mud, stones and gravel, 200 m.

Rossella antarctica, var. *intermedia*, n.
Cinachyra antarctica (Carter).
C. barbata, Sollas.
Adocia tremulus (Topsent).
Calyx arcuarius (Topsent).
Isodictya setifer (Topsent).
I. toxophila, sp.n.
Mycale magellanica (Ridley).
M. acerata, Kirkpatrick.
Iophon radiatus, Topsent.
Tedania massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.
Kirkpatrickia variolosa (Kirkpatrick).
Plocamia gaussiana, Hentschel.
Ophlitaspongia membranacea, Thiele.
Crella crassa, Hentschel.
Crellina tubifex, Hentschel.
Rhizaxinella australiensis, Hentschel.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 177. 5. iii. 27. 27 miles SW of Deception Island, South Shetlands, 63° 17′ 30″ S, 61° 17′ W. Large dredge, mud, coarse sand and stones, 1080 m.

Adocia carduus (Ridley and Dendy).
Biemna chilensis, Thiele.
Polymastia invaginata, Kirkpatrick.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 179. 10. iii. 27. Melchior Island, Schollaert Channel, Palmer Archipelago. In creek to SW of anchorage. Small dredge, rock, 4–10 m.

Iophon radiatus, Topsent.

St. 180. 11. iii. 27. 1·7 miles W of N point of Gand Island, Schollaert Channel, Palmer Archipelago. Large dredge, mud and stones, 160–330 m.

Rossella villosa, Burton.
Haliclonissa verrucosa, sp.n.
Adocia cucurbitiformis (Kirkpatrick).
Tedania massa, Ridley and Dendy.

St. 181. 12. iii. 27. Schollaert Channel Palmer Archipelago, 64° 20′ S, 63° 01′ W. Large otter trawl, mud, 160–335 m.

Gymnorossella inermis, Topsent.
Haliclona penicillata (Topsent).
Tedania massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.

St. 187. 18. iii. 27. Neumayr Channel, Palmer Archipelago, 64° 48′ 30″ S, 63° 31′ 30″ W. Large dredge, mud, 259 m.

Rossella antarctica, var. *intermedia*, n.
Cercidochela lankesteri, Kirkpatrick.
Biemna chilensis, Thiele.
Axociella nidificata (Kirkpatrick).
Polymastia isidis, Thiele.

St. 190. 24. iii. 27. Bismarck Strait, Palmer Archipelago, 64° 56′ S, 63° 35′ W. Large dredge, rock or stones and mud, 93–130 m.

Rossella antarctica, var. *intermedia*, n.
R. nuda, Topsent.
R. racovitzae, Topsent.
R. villosa, Burton.
Gymnorossella inermis, Topsent.
Plakina trilopha, Schulze.
Microxina benedeni (Topsent).
Adocia glacialis (Ridley and Dendy).
Isodictya setifer (Topsent).
I. cactoides (Kirkpatrick).
I. erinacea (Topsent).
I. toxophila, sp.n.
Myxilla australis, Topsent.
Ectyodoryx frondosa, var. *anacantha*, Hentschel.
Clathria toxipraedita, Topsent.
Axociella nidificata (Kirkpatrick).
Eurypon miniaceum, Thiele.
Rhizaxinella australiensis, Hentschel.
Suberites papillatus, Kirkpatrick.
S. microstomus, var. *stellatus*, Kirkpatrick.
Stylocordyla borealis, subsp. *acuata*, Kirkpatrick.

St. 222. 23. iv. 27. St Martin's Cove, Hermite Island, Cape Horn. Large rectangular net, 70–75 m.

Tedania spinata (Ridley).
Halisarca dujardini, var. *magellanica*, Topsent.

(The specimens obtained from St. 222 appear to be all detached. Those of *Tedania spinata* are without visible means of attachment and *Halisarca dujardini*, var. *magellanica* is seated on a piece of *Fucus* (?).)

St. 271. 28–30. vii. 27. Elephant Bay, Angola. Shore collecting.

Hymeniacidon sanguinea (Grant).

St. 283. 14. viii. 27. Off Annobon, Gulf of Guinea, 0·75 to 1 mile N 12° E of Pyramid Rock, Annobon. Large dredge, 18–30 m.

Stylohalina hirta (Topsent).
Bubaris vermiculata (Bowerbank).
Spirastrella purpurea (Lamarck).
Cliona aethiopicus, sp.n.

R.S.S. 'WILLIAM SCORESBY'

St. WS 25. 17. xii. 26. Undine Harbour (North), South Georgia. Small beam trawl, mud and sand, 18–27 m.

Ophlitaspongia thielei, sp.n.

St. WS 27. 19. xii. 26. South Georgia, 53° 55′ S, 38° 01′ W. 1 m. tow-net (touched bottom), gravel, 106–109 m.

Tetilla leptoderma (Sollas).
Haliclona bilamellata, sp.n.
Isodictya toxophila, sp.n.
Plumohalichondria maeandrina (Kirkpatrick).
Tedania charcoti, Topsent.
Myxilla mollis, Ridley and Dendy.
M. australis (Topsent).
M. basimucronata, sp.n.
Kirkpatrickia variolosa (Kirkpatrick).
Stylotellopsis amabilis, Thiele.
Hymeniacidon fernandezi, Thiele.

St. WS 33. 21. xii. 26. South Georgia 54° 59′ S, 35° 24′ W. 1 m. tow-net (touched bottom), grey mud and stones, 130 m.

Grantia cirrata, var. *aurorae*, Dendy.
Cinachyra barbata, Sollas.
Plumocolumella maeandrina (Kirkpatrick).
Iophon radiatus, Topsent.
Clathria toxipraedita, Topsent.
Hymedesmia simillima, var. *antarctica*, Hentschel.

St. WS 42. 7. i. 26. South Georgia, 54° 41′ 45″ S, 36° 47′ W. 1 m. tow-net, grey mud and stones, 198 m.

Cinachyra barbata, Sollas.
Tedania charcoti, Topsent.
Myxilla mollis, Ridley and Dendy.
M. basimucronata, sp.n.
Plocamia gaussiana, Hentschel.

St. WS 62. 19. i. 27. Wilson Harbour, South Georgia. Small beam trawl, 15–45 m.

Homaxinella supratumescens (Topsent).

St. WS 72. 5. iii. 27. Falkland Islands, 51° 07′ S, 57° 34′ W. Commercial otter trawl, sand and shell, 79 m.

Callyspongia fortis (Ridley).
Tedania spinata (Ridley).

St. WS 73. 6. iii. 27. Falkland Islands, 51° 01′ S, 58° 54′ W. Tow-net attached to trawl, fine dark sand, 121 m.

Dasychalina validissima (Thiele).
Isodictya setifer (Topsent).
I. antarctica (Kirkpatrick).
Mycale magellanica (Ridley).
Tedania tenuicapitata, Ridley.

St. WS 75. 10. iii. 27. Falkland Islands, 51° 01′ 30″ S, 60° 31′ W. Commercial otter trawl, 72 m.

Tedania spinata (Ridley).

St. WS 76. 11. iii. 27. Falkland Islands, 51° 00′ S, 62° 02′ 30″ W. Commercial otter trawl, fine dark sand, 205–207 m.

Dasychalina validissima (Thiele).
Tedania tenuicapitata, Ridley.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.

St. WS 77. 12. iii. 27. Falkland Islands, 51° 01′ S, 66° 31′ 30″ W. Commercial otter trawl, coarse dark sand, 110–113 m.

Dasychalina validissima (Thiele).
Callyspongia fusifera (Thiele).
Isodictya setifer (Topsent).
Tedania spinata (Ridley).

St. WS 79. 13. iii. 27. Falkland Islands, 51° 01′ 30″ S, 64° 59′ 30″ W. Commercial otter trawl, fine dark sand, 131–132 m.

Isodictya kerguelensis (Ridley and Dendy).
Guitarra fimbriata, Carter.
Plumocolumella myxillioides, sp.n.
Tedania tenuicapitata, Ridley.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.
Extyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Dictyociona discreta (Thiele).
Halisarca dujardini, var. *magellanica*, Topsent.

St. WS 80. 14. iii. 27. Falkland Islands, 50° 57′ S, 63° 37′ 30″ W. Net of 7 mm. mesh attached to trawl, fine dark sand, 152–156 m.

Plakina trilopha, Schulze.
Isodictya setifer (Topsent).
Plumocolumella myxillioides, sp.n.
Tedania massa, Ridley and Dendy.
T. spinata (Ridley).

St. WS 81. 19. iii. 27. 8 miles N 11° W of North Island, West Falkland Island. Commercial otter trawl and net of 7 mm. mesh attached to trawl, sand, 81–82 m.

Geodia magellani (Sollas).
Microxina benedeni (Topsent).
Adocia carduus (Ridley and Dendy).
Callyspongia flabellata, sp.n.
Isodictya setifer (Topsent).
Plumocolumella myxillioides, sp.n.
Tedania massa, Ridley and Dendy.
Clathria papillosa, Thiele.
Raspaxilla phakellina, Topsent.
Polymastia isidis, Thiele.
Latrunculia lendenfeldi, Hentschel.

St. WS 82. 21. iii. 27. Falkland Islands, 51° 30′ S, 61° 15′ W. Commercial otter trawl, 140–144 m.

Adocia glacialis (Ridley and Dendy).
Gellius fibulatus (Schmidt).
Mycale magellanica (Ridley).
Tedania massa, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Axinella crinita, Thiele.
Polymastia isidis, Thiele.

St. WS 83. 24. iii. 27. 14 miles S 64° W of George Island, East Falkland Island. Commercial otter trawl, fine green sand and shell, 137–129 m.

Haliclona bilamellata, sp.n.
Adocia carduus (Ridley and Dendy).
A. glacialis (Ridley and Dendy).
Dasychalina validissima (Thiele).
Callyspongia fortis (Ridley).
Isodictya setifer (Topsent).
I. antarctica (Kirkpatrick).
Plumocolumella myxillioides, sp.n.
Mycale magellanica (Ridley).
Amphilectus fucorum (Johnston).
Iophon radiatus, Topsent.
I. proximum (Ridley).
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Inflatella belli (Kirkpatrick).
Clathria papillosa, Thiele.
Rhaphidophlus paucispiculus, sp.n.
Stylotellopsis amabilis, Thiele.
Hymeniacidon dubia, sp.n.
Plicatellopsis arborescens, sp.n.
Latrunculia lendenfeldi, Hentschel.

St. WS 84. 24. iii. 27. 7½ miles S 9° W of Sea Lion Island, East Falkland Island. Commercial otter trawl, coarse sand, shells and stones, 75–74 m.

Leucetta leptorhaphis (Jenkin).
Leucettusa haeckeliana (Poléjaeff).
L. simplicissima, sp.n.
Haliclona chilensis (Thiele).
Dasychalina validissima (Thiele).
Callyspongia fortis (Ridley).
Myxilla mollis, Ridley and Dendy.
Anchinoë latrunculioides (Ridley and Dendy).
Clathria papillosa, Thiele.
Rhaphidophlus paucispiculus, sp.n.
Raspaxilla phakellina, Topsent.
Hymeniacidon fernandezi, Thiele.
Plicatellopsis flabellata, sp.n.
Latrunculia lendenfeldi, Hentschel.
Spongia magellanica, Thiele.
Duseideia chilensis (Thiele).

St. WS 85. 25. iii. 27. Falkland Islands, 52° 09′ S, 58° 14′ W. Commercial otter trawl with nets of 4 and 7 mm. mesh attached, sand and shell, 79 m.

Grantia cirrata, var. *tenuipilosa*, n.
Amphilectus rugosus (Thiele).
Iophon proximum (Ridley).
Tedania tenuicapitata, Ridley.
Hymeniacidon fernandezi, Thiele

St. WS 86. 3. iv. 27. Falkland Islands, 53° 53′ 30″ S, 60° 34′ 30″ W. Commercial otter trawl, sand, shell and stones, 151–147 m.

Haliclona bilamellata, sp.n.
Callyspongia fortis (Ridley).
C. fusifera (Thiele).
Isodictya microchela (Topsent).
Guitarra fimbriata, Carter.
Plumocolumella myxillioides, sp.n.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Pseudosuberites sulcatus, Thiele.
Polymastia isidis, Thiele.

St. WS 87. 3. iv. 27. Falkland Islands, 54° 07′ 30″ S, 58° 16′ W. Commercial otter trawl, sand, shell and stones, 96–127 m.

Haliclona bilamellata, sp.n.
Mycale magellanica (Ridley).
Tedania massa, Ridley and Dendy.

St. WS 88. 6. iv. 27. Falkland Islands, 54° 00′ S, 64° 57′ 30″ W. Commercial otter trawl, sand, shell and stones, 96–127 m.

Adocia tenellus (Topsent).
Isodictya setifer (Topsent).
Plumocolumella myxillioides, sp.n.
Amphilectus flabellata, sp.n.
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.
Stelodoryx discovereyi, sp.n.
Clathria papillosa, Thiele.
Latrunculia lendenfeldi, Hentschel.

St. WS 89. 7. iv. 27. Falkland Islands, 9 miles N 21° E of Arenas Point Light, Tierra del Fuego. Commercial otter trawl, mud, gravel and stones, 23–21 m.

Tedania tenuicapitata, Ridley.
Spongia magellanica, Thiele.

St. WS 90. 7. iv. 27. 13 miles N 83° E of Cape Virgins Light, Argentine Republic. Commercial otter trawl, fine dark sand, 82–81 m.

Mycale magellanica (Ridley).
Stelodoryx discovereyi, sp.n.
Pseudosuberites sulcatus, Thiele.

St. WS 91. 8. iv. 27. Tierra del Fuego, 52° 53′ 45″ S, 64° 37′ 30″ W. Commercial otter trawl, fine dark sand and shell. 191–205 m.

Tedania spinata (Ridley).
Pseudosuberites sulcatus, Thiele.

St. WS 93. 9. iv. 27. West Falkland Island, 51° 51′ S, 61° 30′ W. Commercial otter trawl, grey sand, 133–130 m.

Tedania massa, Ridley and Dendy.

St. WS 95. 17. iv. 27. Falkland Islands, 48° 58′ 15″ S, 64° 45′ W. Commercial otter trawl, fine dark sand and stones, 108–109 m.

Tedania spinata (Ridley).
Clathria papillosa, Thiele.
Dictyociona discreta (Thiele).

St. 101. 23. iv. 27. Falkland Islands, 50° 27′ S, 62° 06′ W. 70 cm. tow-net, 150–100 m.

Gymnorossella inermis, Topsent.

St. 102. 23. iv. 27. Falkland Islands, 50° 05′ S, 62° 37′ W. 70 cm. tow-net, 100–50 m.

Gymnorossella inermis, Topsent.

St. WS 99. 19. iv. 27. Falkland Islands, 49° 42′ S, 59° 14′ 30″ W. Commercial otter trawl, fine dark sand, 251–225 m.

Haliclona bilamellata, sp.n.
Microxina benedeni (Topsent).
Isodictya setifer (Topsent).
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.

St. WS 108. 25. iv. 27. Falkland Islands, 48° 30′ 45″ S, 63° 33′ 45″ W. Commercial otter trawl, fine dark sand, 118–120 m.

Haliclona penicillata (Topsent).
Tedania spinata (Ridley).
Pseudosuberites sulcatus, Thiele.

St. WS 109. 26. iv. 27. Falkland Islands, 50° 18′ 48″ S, 58° 28′ 30″ W. Commercial otter trawl, fine dark sand, 145 m.

Dasychalina validissima (Thiele).
Isodictya kerguelensis, var. *simillima* (Hentschel).
I. setifer (Topsent).
I. delicata (Thiele).
Tedania massa, Ridley and Dendy.
T. spinata (Ridley).
Rhaphidophlus paucispiculus, sp.n.
Artemisina plumosa, Hentschel.

St. WS 128. 10. vi. 27. W side of Gough Island, inshore. Large dredge, 120–90 m.

Iophon proximum (Ridley).

St. WS 177. 7. iii. 28. South Georgia, 54° 58′ S, 35° 00′ W. 1 m. tow-net (touched bottom), 97 m.

Mycale magellanica (Ridley).

St. WS 210. 29. v. 28. Falkland Islands, 50° 17′ S, 60° 06′ W. Commercial otter trawl, green sand, 161 m.

Hemigellius pachyderma, sp.n.
Mycale magellanica (Ridley).
Tedania spinata (Ridley).

St. WS 213. 30. v. 28. Falkland Islands, 49° 22′ S, 60° 10′ W. Commercial otter trawl, green sand, mud and pebbles, 249–239 m.

Mycale magellanica (Ridley).

St. WS 216. 1. vi. 28. N of Falkland Islands, 47° 37′ S, 60° 50′ W. Commercial otter trawl, fine sand, 219–133 m.

Tedania massa, Ridley and Dendy.

St. WS 218. 2. vi. 28. N of Falkland Islands, 45° 45′ S, 59° 35′ W. Commercial otter trawl, dark sand, 311–247 m.

Tetilla leptoderma (Sollas).

St. WS 222. 8. vi. 28. Falkland Islands, 48° 23′ S, 65° 00′ W. Commercial otter trawl, coarse brown sand, 100–106 m.

Mycale magellanica (Ridley).
Tedania spinata (Ridley).

St. WS 223. 8. vi. 28. NE of Falkland Islands, 49° 13′ S, 64° 52′ W. Commercial otter trawl, coarse brown sand, 114 m.

Haliclonissa sacciformis, sp.n.
Guitarra fimbriata, Carter.

St. WS 225. 9. vi. 28. Falkland Islands, 50° 20′ S, 62° 30′ W. Commercial otter trawl, green sand, shells and pebbles, 162–161 m.

Rossella racovitzae, Topsent.
Gymnorossella inermis, Topsent.
Tetilla leptoderma (Sollas).
Mycale magellanica (Ridley).
Tedania massa, Ridley and Dendy.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Hymedesmia simillima, var. *antarctica*, Hentschel.
Rhizaxinella australiensis, Hentschel.

St. WS 229. 1. vii. 28. Falkland Islands, 50° 35′ S, 57° 20′ W. Net of 4 mm. mesh attached to trawl, fine green sand, 210–271 m.

Amphilectus fucorum (Esper).

St. WS 231. 4. vii. 28. Falkland Islands, 50° 10′ S, 58° 42′ W. Commercial otter trawl, fine green sand, 167–159 m.

Tedania massa, Ridley and Dendy.

St. WS 233. 5. vii. 28. Falkland Islands, 49° 25′ S, 59° 45′ W. Commercial otter trawl, fine green sand, 185–175 m.

Dasychalina validissima (Thiele).
Mycale magellanica (Ridley).

St. WS 237. 7. vii. 28. N of Falkland Islands, 46° 00′ S, 60° 05′ W. Commercial otter trawl, coarse brown sand and shells, 150–256 m.

Dasychalina validissima (Thiele).
Pseudanchinoë toxifera (Topsent).

St. WS 239. 15. vii. 28. Falkland Islands, 51° 10′ S, 62° 10′ W. Commercial otter trawl, coarse dark sand, 196–193 m.

Rossella nuda, Topsent.
Isodictya setifer (Topsent).
Mycale magellanica (Ridley).
Tedania tenuicapitata, Ridley.
T. spinata (Ridley).
Myxilla mollis, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley & Dendy).
Suberites montiniger (Carter).

St. WS 243. 17. vii. 28. NE of Falkland Islands, 51° 06′ S, 64° 30′ W. Commercial otter trawl and net of 4 mm. mesh attached, coarse dark sand, 144–141 m.

Leucettusa haeckeliana (Poléjaeff).
Tetilla leptoderma (Sollas).
Haliclona tubuloramosa (Dendy).
H. conica (Brøndsted).
H. bilamellata, sp.n.
Dasychalina validissima (Thiele).
Isodictya setifer (Topsent).
Guitarra fimbriata, Carter.
Plumocolumella myxillioides, sp.n.
Biemna chilensis, Thiele.
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
T. spinata (Ridley).
Myxilla verrucosa, sp.n.
Ectyodoryx paupertas, subsp. *nobile* (Ridley and Dendy).
Anchinoë latrunculioides (Ridley and Dendy).
Stelodoryx pluridentata (Lundbeck).
Dictyociona discreta (Thiele).
Clathria toxipraedita, Topsent.
Plicatellopsis arborescens, sp.n.
Pseudosuberites hyalinus (Ridley and Dendy).
Latrunculia lendenfeldi, Hentschel.
Dusсideia tenuifibra, sp.n.

St. WS 244. 18. vii. 28. Falkland Islands, 52° 00′ S, 62° 40′ W. Commercial otter trawl, fine dark sand and mud, 253–247 m.

Mycale magellanica (Ridley).
Tedania massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.

St. WS 246. 19. vii. 28. Falkland Islands, 52° 25′ S, 61° 00′ W. Commercial otter trawl, coarse green sand and pebbles, 267–208 m.

Isodictya setifer (Topsent).
Plumocolumella myxillioides, sp.n.
Mycale magellanica (Ridley).
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.
Latrunculia lendenfeldi, Hentschel.

St. WS 247. 19. vii. 28. Falkland Islands, 52° 40′ S, 60° 05′ W. Large dredge, rock, 172 m.

Haliclona bilamellata, sp.n.
Mycale magellanica (Ridley).
Iophon proximum (Ridley).
Myxilla mollis, Ridley and Dendy.
Ectyodoryx paupertas, subsp. *nobile* (Ridley and Dendy).

St. WS 248. 20. vii. 28. Falkland Islands, 52° 40′ S, 58° 30′ W. Commercial otter trawl, fine green sand, pebbles and shells, 210–242 m.

Rossella racovitzae, Topsent.
Microxina benedeni (Topsent).
Isodictya setifer (Topsent).
Plumocolumella myxillioides, sp.n.
Mycale magellanica (Ridley).
M. lapidiformis (Ridley and Dendy).
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
Inflatella belli (Kirkpatrick).
Polymastia isidis, Thiele.
Latrunculia lendenfeldi, Hentschel.

St. WS 249. 20. vii. 28. Falkland Islands, 52° 10′ S, 57° 30′ W. Large dredge, fine brown and green sand, shells and stones, 166 m.

Mycale magellanica (Ridley).
Tedania spinata (Ridley).
Ectyodoryx paupertas, subsp. *nobile* (Ridley and Dendy).

St. WS 250. 20. vii. 28. Falkland Islands, 51° 45′ S, 57° 00′ W. Commercial otter trawl, fine green sand, 251–313 m.

Gymnorossella inermis, Topsent.
Mycale magellanica (Ridley).
Tedania tenuicapitata, Ridley.
T. massa, Ridley and Dendy.
Myxilla mollis, Ridley and Dendy.
Polymastia isidis, Thiele.

MARINE BIOLOGICAL STATION

St. MS 14. 17. ii. 25. From 1·5 miles SE by S to 1·5 miles S ½° W of Sappho Point, East Cumberland Bay. Small dredge, 190–110 m.

Homaxinella supratumescens (Topsent).

St. MS 68. 2. iii. 26. East Cumberland Bay, South Georgia, from 1·7 miles S ½° E to 8½ cables SE by E of Sappho Point. Large rectangular net, 220–247 m.

Rossella nuda, Topsent.
Isodictya cactoides (Kirkpatrick).

St. MS 71. 9. iii. 26. East Cumberland Bay, South Georgia, from 9¼ cables E by S to 1·2 miles E by S of Sappho Point. Small beam trawl, 120–60 m.

Cinachyra barbata, Sollas.
Mycale tridens, Hentschel.
Myxilla mollis, Ridley and Dendy.

Saldanha Bay, South-west Africa (beach).

Haliclona stephensi, sp.n.
Hymeniacidon caruncula, Bowerbank.

DESCRIPTIONS OF SPECIES

Phylum NUDA

Order HEXACTINELLIDA

Family ROSSELLIDAE

Genus Rossella, Carter

Rossella antarctica, var. intermedia, n. (Fig. 3 *b*, p. 257).

Occurrence. St. 42: South Georgia, 120–204 m.; St. 152: South Georgia, 245 m.; St. 156: South Georgia, 200–236 m.; St. 175: South Shetlands, 200 m.; St. 187: Palmer Archipelago, 259 m.; St. 190: Palmer Archipelago, 93–130 m.

Remarks. The six specimens present are all immature forms obtained from South Georgia and the South Shetlands. The smallest is about 1 cm. in diameter and the largest no more than 7 cm. high. In most respects they are quite typical of the species, but their method of attachment leads to a number of interesting considerations. Two of the specimens have the normal tuft of basalia, a third is without the basal half of the sponge, and the three remaining are without basalia but have anchored themselves to pieces of black volcanic rock.

Two forms of *R. antarctica* have been known hitherto, var. *antarctica* from the Antarctic and var. *solida* from the Kerguelen region. In the present group of specimens we have a third variety which is intermediate between these two, suggesting that they are no more than geographical varieties of a single species. The main differences between the var. *antarctica* and the var. *solida* are that in the former there is invariably(?) a basal tuft, that the velum is more strongly developed and that the rays of the pentactin pleuralia are more or less cruciform; whereas in the latter, the sponge is always attached directly to the substratum, the velum is but feebly developed and the rays of the pentactin pleuralia are confined to a sector of about 140° (Fig. 3 *b*). The present specimens are completely intermediate between the two older varieties in these three distinguishing features: the sponge may have a basal tuft or may be attached directly to the substratum, the velum is moderately well developed (in one specimen it is present on one side of the sponge and completely absent on the other, although the diactin pleuralia are equally well developed all over), and the rays of the pentactin pleuralia are confined usually to a sector of 180°.

With regard to the question whether a species which normally has a basal tuft may be represented by specimens attached directly to the substratum (cf. Kirkpatrick, 1907, p. 6), the present specimens contribute some relevant data. The individuals of var. *intermedia* seem to be able equally well to produce a basal tuft or to attach themselves direct, and there is evidence that the same thing is true, though perhaps to a lesser extent, in *R. nuda*, Topsent, and *R. racovitzae*, Topsent (*q.v.*).

One of the specimens is a "twin", recalling the specimen of var. *solida* originally described by Schulze (1887) from Kerguelen.

Among the specimens from St. 156 is a small bundle of pentactin pleuralia from an individual of var. *intermedia* bearing a bud about 3 mm. in length. The presence of this bud in a jar which included, together with non-Hexactinellid sponges, only a small specimen of the present variety, suggests that it was found free and had not been accidentally torn away from a larger, budding specimen. If correct, this surmise offers an explanation as to how the buds of *R. antarctica*, which migrate along the shafts of the pentactin pleuralia, get over the obstacle offered by the rays at the ends of the pleuralia. Presumably the pentacts bearing the buds are shed and the buds thus released.

Rossella nuda, Topsent (Figs. 1, 2).

(For synonymy see Burton, 1929, p. 409.)

Occurrence. St. 39: South Georgia, 179–235 m.; St. 45: South Georgia, 238–270 m.; St. 123: South Georgia, 230–250 m.; St. 148: South Georgia, 132–148 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 239: Falkland Islands, 196–193 m.; St. MS 68: South Georgia, 220–247 m.

REMARKS. The several specimens, only three of which are dry, range in size from a few cm. to 77 cm. high, and show all the variations illustrated by me (1929, p. 406, text-fig. 1), including that of the *hodgsoni* form. Of the specimens from St. 190, one is fragmentary and the other is a "twin" (cf. *R. antarctica*, var. *intermedia*) 14 cm. high and very like the holotype of "*Aulorossella levis*". The specimens from Sts. 39 and MS 68 consist of papillae torn from the surfaces of large specimens of the *c*-form.[1] The specimen from St. 148 is sub-spherical, 10 cm. high, with surface almost apapillose, but with strongly developed bundles of pleuralia projecting from the surface. There are only vestiges of a root-tuft and the base is truncate with small pebbles, etc., buried in its outer tissues. This specimen combines the sub-spherical shape of both the *a*-form and the *c*-form, the surface of the *b*-form, and, in having no root-tuft, it approximates also to both the *e*-form and the *f*-form. The specimen from St. 123 is cylindrical, 14 cm. high and 5 cm. in diameter, with slightly papillose surface beset with feeble bundles of pleuralia.

[1] These letters correspond to the letters given in my Terra Nova Report, 1929, text-fig. 2.

It is pedunculate, without root-tuft, and still bears at its base a portion of the black rock on which it was growing.

Fig. 1. *Rossella nuda*, Topsent. Base of a specimen from St. 123, with basal tuft and an incipient stalk. × $\frac{3}{8}$.

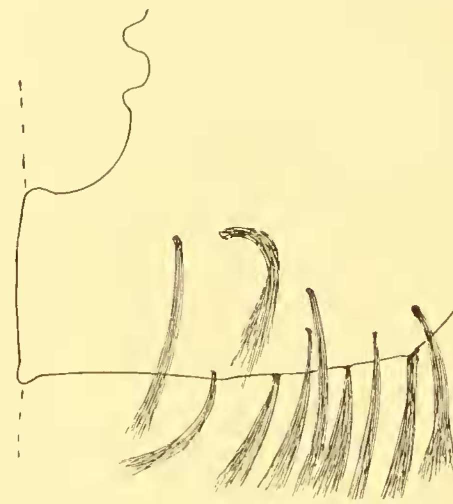

Fig. 2. *Rossella nuda*, Topsent. A second specimen showing the same features, but with the stalk placed laterally.

The next three specimens are dried. The first is cylindrical, 75 cm. high by 30 cm. in diameter, with only a scanty root-tuft as in the *d*-form. The lower two-thirds of the sponge is covered with numerous well-developed papillae without projecting pleuralia, but on the upper third the papillae are scarce. They are often as much as 5 cm. high and may be bifid, or even trifid. In this sponge, then, are combined the characters of the *b*-, *c*- and *d*-forms. The second specimen, 22 cm. high and 9 cm. in diameter, is completely covered with small papillae devoid of projecting pleuralia, and with the basalia segregated into sparse bundles as in the *d*-form. The basalia are few in number and feebly developed, recalling the condition found in the *e*- and *f*-forms. The chief interest of this specimen is, however, the fact that the sponge was probably attached directly by its base, and did not rely on its basal tuft although it is slightly developed, since this is continued downwards as a short stalk (Fig. 1). But, judging by the appearance of the base, and by the presence of numerous small fragments of black rock embedded in the outer tissues, it was not attached to a rock but buried in the mud. The third specimen is very similar to the foregoing, is 30 cm. high and 17 cm. in diameter, completely covered with papillae and bears sparse bundles of basalia. This sponge appears to have been attached by a laterally placed basal plate (Fig. 2).

Distribution. South Georgia; Graham Land; Victoria Land; Wilhelm Land.

Rossella racovitzae, Topsent.

(For synonymy see Burton, 1929, p. 407.)

Occurrence. St. 160: near Shag Rocks, 177 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 248: Falkland Islands, 210–242 m.

REMARKS. Of the two small specimens, the larger, 3 cm. high by 2 cm. in diameter, has a distinct basal tuft; but the smaller, less than 5 mm. in diameter, has no recognizable tuft and is fixed by the base to a Serpulid tube.

DISTRIBUTION. South Orkneys; Graham Land; Victoria Land; Wilhelm Land.

Rossella villosa, Burton.

R. villosa, Burton, 1929, p. 412, pl. iii.

Occurrence. St. 180: Palmer Archipelago, 160–330 m.; St. 190: Palmer Archipelago, 93–130 m.

REMARKS. There are two immature specimens, the largest 5 cm. high, which appear to belong to this species; but since the basalia are missing in each it is impossible to be quite certain of the identification, especially as they resemble the young forms of *R. nuda*, Topsent, in many ways.

DISTRIBUTION. Victoria Land.

Genus **Gymnorossella**, Topsent

Gymnorossella inermis, Topsent (Fig. 3 *d–g*).

G. inermis, Topsent, 1916, p. 164; *id.*, 1917, p. 22, pl. i, fig. 1, pl. v, fig. 4; Burton, 1929, p. 413.

Occurrence. St. 181: Palmer Archipelago, 160–335 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 101: Falkland Islands, 100–150 m.; St. WS 102: Falkland Islands, 50–100 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 250: Falkland Islands, 251–313 m.

REMARKS. The larger of the two specimens is 20 cm. high and both agree closely with the holotype. The only point worth noting here is the variation in the angles of the rays

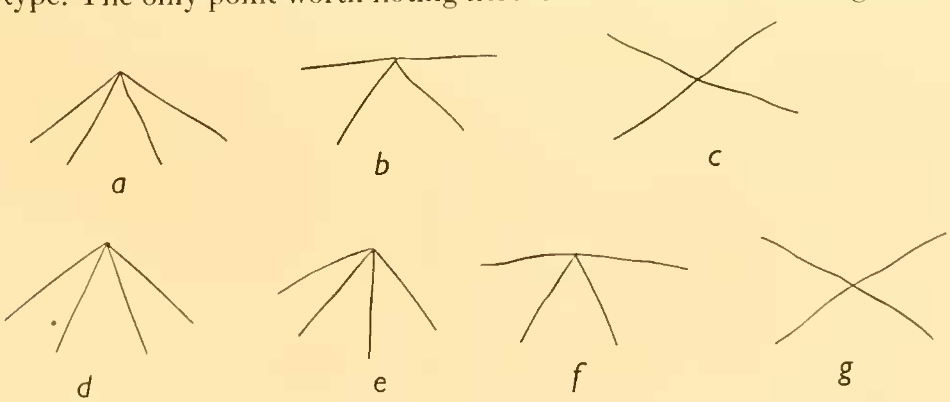

Fig. 3. Showing variation in rays of pentactin, pleuralia and basalia: *a*, *Rossella antarctica solida*; *b*, *R. antarctica intermedia*; *c*, *R. antarctica antarctica*; *d–g*, *Gymnorossella inermis*.

of the pentactin basalia. In the larger specimen (from St. 181) these are all disposed within an angle of less than 180°; in the second specimen they vary a good deal, and although in most of the basalia the rays are confined within an angle of less than 180°, some are cruciform (Fig. 3 *d–g*) and there are all intermediates.

DISTRIBUTION. Graham Land.

Phylum GELATINOSA

Order CALCAREA

Family HOMOCOELIDAE

Genus **Leucosolenia**, Bowerbank

Leucosolenia macleayi (Lendenfeld).

(For synonymy see Burton, 1930, p. 14.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. Two small stipitate sponges, about 12 mm. in height and with a stalk 7 mm. long, with the typical external form. In the spicules the basal ray measures 0·09 mm. and the lateral rays 0·045 mm.

DISTRIBUTION. Practically cosmopolitan.

Leucosolenia discovereyi, Jenkin.

L. discovereyi, Jenkin, 1908, p. 6, pl. xxviii, figs. 12, 13.

Occurrence. St. 53: Falkland Islands, 0–2 m.

REMARKS. Numerous small specimens growing among Hydroids on a *Mytilus* shell.

DISTRIBUTION. Victoria Land.

Family LEUCASCIDAE

Genus **Pericharax**, Poléjaeff

Pericharax pyriformis, sp.n. (Plate XLVIII, figs. 1, 2).

Holotype. B.M. 28. 2. 15. 36.

Occurrence. St. 160: Shag Rocks, 177 m.

DIAGNOSIS. Sponge pyriform, with single apical oscule; skeleton a mixture of large and small triradiates in chamber layer, with a dermal skeleton of triradiates, a gastral skeleton of quadriradiates and oscular skeleton of quadriradiates.

REMARKS. This is a typical *Pericharax*, the skeleton of which closely resembles those of both *P. heteroraphis* and *P. peziza*, but which differs from both in the external form. The three specimens representing this species are all pyriform, with a single apical oscule which leads out from a shallow cloaca bearing in its walls the openings of the main exhalant canals. The surface is slightly uneven and rough to the touch. The colour, in spirit, is a greyish white. The largest specimen, the holotype, measures 2 cm. high and 1·5 cm. across the broadest part. The diameter of the oscule is 2 mm.

Spicules. (1) Large triradiates of the main skeleton, equiangular and equiradiate, rays straight but gradually and sharply pointed, measuring up to 1·2 mm. long and 0·096 mm. thick at the base.

(2) Small triradiates of the main skeleton, equiangular and equiradiate, with straight rays measuring up to 0·24 mm. long by 0·015 mm. thick at the base.

(3) Triradiates of the dermal skeleton slightly irregular and arranged tangentially to the surface, each ray about 0·24 mm. long.

(4) Quadriradiates of the oscular margin sagittal with facial rays 0·105 mm. long and apical rays 0·12 mm. long.

(5) Quadriradiates of the gastral cortex and larger exhalant canals, of similar dimensions to (4) but not sagittal.

Genus **Leucetta**, Haeckel

Leucetta leptoraphis (Jenkin).

Leucandra primigenia, var. *leptoraphis*, Jenkin, 1908, p. 14, pl. xxix, figs. 33, 34; *Leucetta antarctica*, Dendy, 1918, p. 8, pl. i, figs. 2-7; *L. leptoraphis*, Burton, 1929, p. 404, pl. v, figs. 1-4.

Occurrence. St. 39: South Georgia, 179-235 m.; St. 42: South Georgia, 120-204 m.; (St. 84: 32° S, 1° E, 75-74 m.; there is evidently a doubt about this station which should probably be Palmer Archipelago, St. 190); St. 140: South Georgia, 122-136 m.; St. 148: South Georgia, 132-148 m.; St. WS 84: Falkland Islands, 75-74 m.

Remarks. Some ten specimens are present agreeing with the holotype in spiculation and showing the same range in external form as that to which I have drawn attention in my Terra Nova report (*loc. cit.*).

Distribution. Victoria Land.

Leucetta macquariensis, Dendy.

L. macquariensis, Dendy, 1918, p. 9, pl. i, figs. 3, 8.

Occurrence. St. 53: Falkland Islands, 0-2 m.; St. 55: Falkland Islands, 10-16 m.; St. 56: Falkland Islands, 10½-16 m.; St. 145: South Georgia, 26-35 m.; St. 156: South Georgia, 200-236 m.

Remarks. There are considerable differences between the individuals of this species as regards the large oxea and the microxea. One or other of these types of spicules may be sparingly present or even entirely absent, and but for the fact that they are never both absent altogether, the task of identification would present some difficulty. Even so, it is easy to imagine that single specimens examined alone might conceivably be placed in a different species, owing to the absence of one or other of these spicules, and it is quite possible that the case may yet arise in which an individual will be found to have lost both sets of spicules entirely.

Distribution. Macquarie Island.

Family LEUCALTIDAE

Genus **Leucaltis**, Haeckel

Leucaltis gastrorhabdifera, sp.n. (Figs. 4, 5).

Holotype. B.M. 28. 2. 15. 833.

Occurrence. St. 6: Tristan da Cunha, 80-140 m.

Diagnosis. Sponge erect, tubular, without oscular fringe; surface very minutely and sparingly hispid; skeleton composed of a dermal layer of triradiates, with large sagittal quadriradiates forming skeleton of chamber layer and a layer of large rhabds immediately beneath gastral surface; rhabds similar to those of gastral layer found projecting, sparingly, from dermal surface; triradiates of dermal tangential layer, equiangular and equiradiate, rays 0·18 by 0·01 mm.; quadriradiates of chamber layer, apical rays 0·18 by 0·01 mm. and basal rays 0·28 to 0·42 by 0·024 mm.; rhabds 0·59 by 0·022 mm.

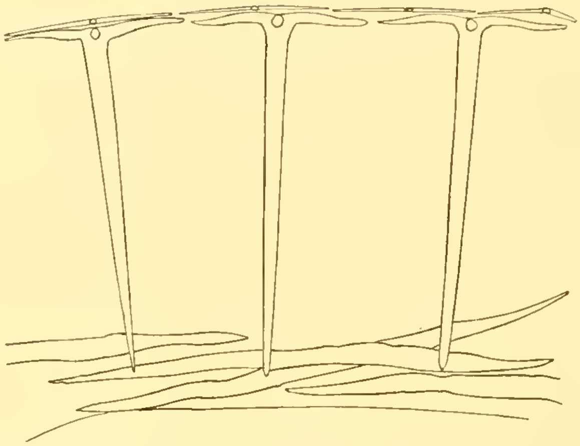

Fig. 4. *Leucaltis gastrorhabdifera*, sp.n. Section of body wall to show arrangement of skeleton (semi-diagrammatic).

REMARKS. The holotype is no more than 1 cm. high and 2 mm. in diameter. To have described adequately the spicules of the oscular margin, according to custom, would have meant the total destruction of the specimen, and since these spicules are not of diagnostic importance, no attempt has been made to examine them.

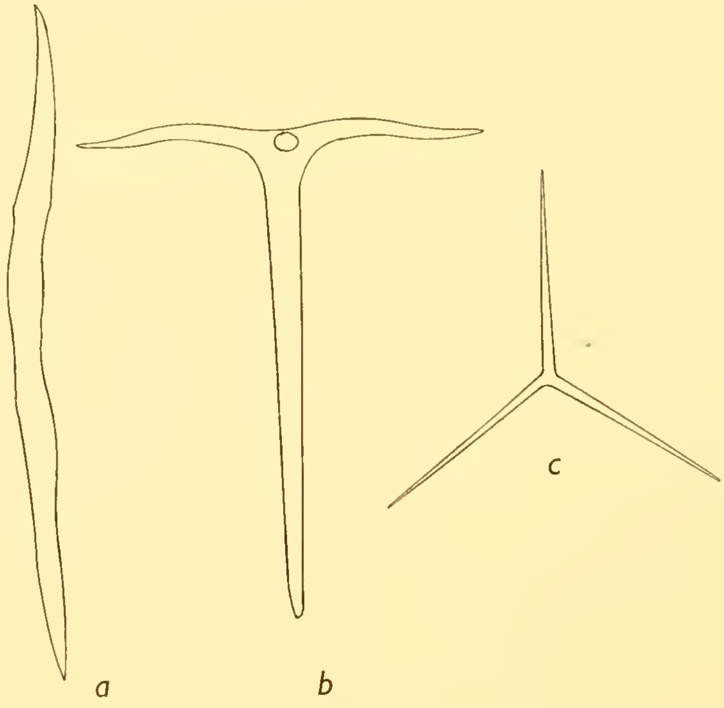

Fig. 5. *Leucaltis gastrorhabdifera*, sp.n. *a*, rhabd; *b*, sagittal quadriradiate; *c*, dermal triradiate. × 150.

The present species differs from the only other known species of the genus, *L. clathria*, Haeckel, in external form, in the absence of small radiates from the gastral and chamber layers, and in the presence of the large rhabds.

Genus Leucettusa, Haeckel

Leucettusa haeckeliana (Poléjaeff).

Leucetta haeckeliana, Poléjaeff, 1883, p. 69, pl. ii, fig. 6, pl. viii, figs. 1–6; *Leucettusa haeckeliana*, Dendy and Row, 1913, p. 739.

Occurrence. St. WS 84: Falkland Islands, 75–74 m.; St. WS 243: Falkland Islands, 144–141 m.

DISTRIBUTION. Kerguelen.

Leucettusa simplicissima, sp.n. (Plate XLVIII, fig. 3).

Holotype. B.M. 28. 2. 15. 35.

Occurrence. St. WS 84: Falkland Islands, 75–74 m.

DIAGNOSIS. Sponge tubular; skeleton of chamber layer composed of triradiates and quadriradiates of fairly constant size; cortical skeleton composed of a dense mass of large triradiates; without special gastral skeleton.

REMARKS. The species is represented by a quantity of branching tubes, each one being cylindrical and slightly flattened, with a single apical oscule. The tubes appear to have grown erect but now there is nothing to show their method of attachment. The largest are 3 cm. high and 7 mm. in diameter. There is no oscular fringe. The cortical and medullary layers are well marked, the latter being the thicker. The flagellated chambers are elongate, reaching from the gastral surface to just beneath the dermal cortex.

The chamber layer contains small triradiates and quadriradiates of fairly constant size scattered sparsely between the chambers. These are of the normal type and the rays of a typical example measure 0·036 by 0·006 mm. Occasionally these spicules may suffer reduction to two rays.

The cortical skeleton consists of a mass of large irregularly placed triradiates of fairly constant size, several layers thick, the rays of which may reach as much as 0·21 mm. in length and 0·018 mm. in thickness.

There is no special gastral skeleton, although occasionally triradiates similar in all respects to those of the chamber layer may be found lying tangentially in the wall of the gastral cavity.

The characteristic feature of this species is the simplicity of its skeleton, and in this it differs markedly from all the known species of *Leucettusa*. If anything is to be said of its relations to other species it is that *L. simplicissima* is more nearly like *L. tubulosa*, Dendy, from New Zealand, in external form, but approaches *L. haeckeliana* (Poléjaeff), from Kerguelen in spiculation. In fact, it differs from the latter mainly in the absence of the large quadriradiates.

Family GRANTIIDAE

Genus Grantia, Fleming

Grantia cirrata (Jenkin), var. aurorae, Dendy.

G. cirrata, var. *aurorae*, Dendy, 1918, p. 11, pl. I, figs, 4, 9.

Occurrence. St. 53: Falkland Islands, 0–2 m.; St. WS 33: South Georgia, 130 m.

DISTRIBUTION. Off Oates Land.

Grantia cirrata (Jenkin), var. tenuipilosa, n.

Type of var. B.M. 28. 2. 15. 708.

Occurrence. St. 53: Falkland Islands, 0–2 m.; St. WS 85: Falkland Islands, 79 m.

REMARKS. The two specimens are very like the typical form in external appearance, in the arrangement of the skeleton and in the size of the spicules. The only feature by which this variety may be distinguished is the form of the long oxea echinating the surface. These are usually 1·2 mm. in length but rarely exceed 0·012 mm. in diameter, and are only slightly, though very irregularly, curved.

The typical form of the species, together with the var. *aurorae* and the present variety, are all very much alike except for the form of the dermal oxea, and it is probable that a distinction into varieties is unnecessary. But until we can see for certain that the dermal oxea are subject to considerable variations in size, I prefer to consider the present specimens as constituting a separate variety of the species.

Order TETRAXONIDA

Sub-order *HOMOSCLEROPHORA*

Family PLAKINIDAE

Genus Plakina, Schulze

Plakina monolopha, Schulze.

P. monolopha, Schulze, 1880, p. 407, pl. xx, figs. 1–7, pl. xxii, figs. 22–29; Graeffe, 1882, p. 319; Sollas, 1888, p. 278; Topsent, 1890, p. 231; Lendenfeld, 1894, p. 96, pl. iii, fig. 46; Topsent, 1896, p. 549, pl. xxi, figs. 1, 2, pl. xxii, fig. 12; Thiele, 1898, p. 28, pl. v, fig. 13, pl. vii, fig. 11; Lendenfeld, 1903, p. 120; *id.*, 1907, p. 336; Topsent, 1925, p. 629; Burton, 1929, p. 414.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DISTRIBUTION. North Atlantic; Mediterranean; Japan; Antarctic.

Plakina trilopha, Schulze.

P. trilopha, Schulze, 1880, p. 407, pl. xx, figs. 1–7; *Placina trilopha*, Sollas, 1888, p. 279; Topsent, 1890, p. 232; Lendenfeld, 1894, p. 98, pl. iii, fig. 45, pl. iv, fig. 54; Topsent, 1896, p. 555, pl. xxi, figs. 4–6; Lendenfeld, 1903, p. 121; *Plakina trilopha*, subsp. *antarctica*, *id.*, 1907, p. 333, pl. xxv, figs. 30–43; *Placina trilopha*, Babic, 1921, p. 17; *id.*, 1922, p. 291; *Plakina trilopha*, Burton, 1929, p. 414.

Occurrence. St. 140: South Georgia, 122–136 m.; St. 152: South Georgia, 245 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 80: Falkland Islands, 152–156 m.

DISTRIBUTION. Mediterranean; Wilhelm Land.

Sub-order *STREPTASTROSCLEROPHORA*

Family PACHASTRELLIDAE

Genus **Pachastrella**, Schmidt

Pachastrella monilifera, Schmidt.

(For synonymy see Burton, 1926, p. 9.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DISTRIBUTION. Algeria; Mediterranean; Coast of Asturias; Cape Bojeador; Tristan da Cunha; Natal; Agulhas Bank.

Genus **Poecillastra**, Sollas

Poecillastra compressa (Bowerbank).

(For synonymy see Burton, 1930, pp. 487, 498.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. In two of the specimens the calthrops have undergone a considerable reduction and distortion, one or more of the rays being frequently reduced and those remaining being variously knobbed at the ends or ornamented with tubercles and spines. The condition closely resembles that of *Stelletta pathologica*, Schmidt, or *Pachastrella abyssi* (cf. Sollas, 1888, pl. xi, figs. 15–19). The distortion has extended to the microxea also, although not to the same extent, and these are thicker, less markedly roughened, but more strongly tylote than usual.

DISTRIBUTION. Arctic; North Atlantic (east and west coasts); Mediterranean.

Sub-order *ASTROSCLEROPHORA*

Family GEODIIDAE

Genus **Geodia**, Lamarck

Geodia magellani (Sollas).

Cydonium magellani, Sollas, 1886, p. 197; *id.*, 1888, p. 221, pl. xxi, figs. 1–14; *Geodia magellani*, Lendenfeld, 1903, p. 107; Thiele, 1905, p. 408.

Occurrence. St. WS 81: Falkland Islands, 81–82 m.

DISTRIBUTION. Tom Bay, Calbuco and Admiralty Straits (South America).

Family ERYLIDAE

Genus Erylus, Gray

Erylus discophorus (Schmidt).

(For synonymy see Lendenfeld, 1903, p. 87.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. The present specimen forms a thin brown crust on the surface of a piece of rock. The skeleton is composed as follows: amphistrongyles, 0·75 by 0·012 mm.; dichotriaenes, shaft 0·4 mm. long, primary cladi, 0·15 mm. long, and secondary cladi, 0·18 mm. long; sterrasters, 0·15 by 0·09 by 0·012 mm.; oxyasters, with 5–12 rays, 0·024–0·06 mm. in diameter, the larger spicules having usually the smaller number of rays; centrotylote microxea, 0·045 by 0·002 mm. In spiculation therefore the specimen agrees closely with the Mediterranean examples of the species except for the presence of strongyles instead of oxea. On the other hand, I am strongly inclined to the view that the spicules of the various species of *Erylus* may vary a great deal more than has hitherto been suspected, judging by my observations on a number of specimens of this genus from the Indo-Pacific.

The following species from the Atlantic, and adjacent waters, *E. discophorus*, *E. mammillaris*, *E. transiens*, *E. nummulifer*, *E. granularis* and *E. chavesi*, and *E. oxyaster* from the Galapagos Islands, all agree in possessing oxea, or their derivatives, dichotriaenes, sterrasters, oxyasters and microxea. The differences between them amount to no more than small, and probably unimportant, differences in external form and spiculation, and it is highly probable that they all represent nothing more than a single species.

DISTRIBUTION. Mediterranean; Spain.

Sub-order *SIGMATOSCLEROPHORA*

Family TETILLIDAE

Genus Tetilla, Schmidt

Tetilla leptoderma (Sollas).

(For synonymy see Burton, 1929, p. 418.)

Occurrence. St. 39: South Georgia, 179–235 m.; St. 140: South Georgia, 122–136 m.; St. 148: South Georgia, 132–148 m.; St. 170: Clarence Island, 342 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 218: north of Falkland Islands, 311–247 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 243: north-east of Falkland Islands, 144–141 m.

DISTRIBUTION. Kerguelen; South America; Victoria Land.

Genus Cinachyra, Sollas

Cinachyra antarctica (Carter).

(For synonymy see Burton, 1929, p. 419.)

Occurrence. St. 42: South Georgia, 120–204 m.; St. 175: South Shetlands, 200 m.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Cinachyra barbata, Sollas.

(For synonymy see Burton, 1929, p. 419.)

Occurrence. St. 27: South Georgia, 110 m.; St. 42: South Georgia, 120–204 m.; St. 123: South Georgia, 230–250 m.; St. 140: South Georgia, 122–136 m.; St. 153: South Georgia, 106 m.; St. 170: Clarence Island, 342 m.; St. 175: South Shetlands, 200 m.; St. WS 33: South Georgia, 130 m.; St. WS 42: South Georgia, 198 m.; St. MS 71: South Georgia, 120–60 m.

DISTRIBUTION. Kerguelen; Graham Land; Victoria Land; Wilhelm Land.

Cinachyra coactifera (Lendenfeld).

Tethya coactifera, Lendenfeld, 1906, p. 75, pl. ix, figs. 1–16, pl. x, figs. 1–10; *Cinachyra coactifera*, Burton, 1929, p. 396.

Occurrence. St. 39: South Georgia, 179–235 m.

REMARKS. The eleven specimens range from 6 to 12 cm. in diameter. The majority are without conspicuous surface pile or basal tuft, but in two of them both these features are well developed. The porocalices in the dried sponge are inconspicuous and might be easily mistaken for small and simple oscules, and it is probably on this account that the species was first referred to *Tethya* (= *Tetilla*).

DISTRIBUTION. Kerguelen.

Family HAPLOSCLERIDAE

Genus Haliclona, Grant

Haliclona nodosa (Thiele).

Reniera nodosa, Thiele, 1905, p. 461, figs. 7, 77.

Occurrence. St. 145: South Georgia, 26–35 m.

DISTRIBUTION. Calbuco, Chile.

Haliclona chilensis (Thiele).

Reniera chilensis, Thiele, 1905, p. 467, figs. 5, 84.

Occurrence. St. WS 84: Falkland Islands, 75–74 m.

REMARKS. A small tubular specimen agreeing with the holotype in all respects, except that it is dark brown in colour and possesses spicules measuring 0·12 by 0·009 mm. as against 0·165 by 0·01 mm. in the type.

DISTRIBUTION. Calbuco, Chile.

Haliclona variabilis (Thiele).

Acervochalina variabilis, Thiele, 1905, p. 477, figs. 17, 33, 96.

Occurrence. St. 53: Falkland Islands, 0–2 m.

REMARKS. Two of the specimens are almost identical in every way with the holotype (Thiele, *loc. cit.* pl. xxviii, fig. 17). The four other specimens, which resemble the holotype in skeleton, colour, texture and appearance of the surface, are irregularly pyriform with large oscules (Plate LI, figs. 1, 2).

DISTRIBUTION. Punta Arenas and Juan Fernandez.

Haliclona penicillata (Topsent).

Reniera penicillata, Topsent, 1908, p. 20, pl. ii, figs. 2, 3, pl. v, fig. 14; *Chalina penicillata*, Burton, 1929, p. 420.

Occurrence. St. 181: Palmer Archipelago, 160–335 m.; St. WS 108: Falkland Islands, 118–120 m.

REMARKS. The two specimens agree closely with the holotype except that in one of them the oxea are mostly centrotylote and a few are modified to styli.

DISTRIBUTION. Graham Land; Victoria Land.

Haliclona gaussiana (Hentschel).

Siphonochalina gaussiana, Hentschel, 1914, p. 136, pl. iv, fig. 17, pl. viii, fig. 17.

Occurrence. St. 42: South Georgia, 120–204 m.

REMARKS. The present specimen differs from the holotype only in the absence of polyspicular fibres and in the dimensions of the spicules. These are: oxea 0·15 mm. long, and toxa not exceeding 0·04 mm. in length.

The skeleton is a unispicular (renieroid) network with triangular mesh, and the outermost spicules hispidate the surface. There is no special dermal skeleton. The species is therefore a typical *Haliclona*.

DISTRIBUTION. Wilhelm Land.

Haliclona tubuloramosa (Dendy).

Gellius tubuloramosus, Dendy, 1924, p. 323.

Occurrence. St WS 243: Falkland Islands, 144–141 m.

REMARKS. A solitary example of this species is present. I have made a specially careful comparison with the holotype, since species common to the Falklands and to New Zealand are of rare occurrence.

DISTRIBUTION. New Zealand.

Haliclona conica (Brøndsted).

Pachychalina conica, Brondsted, 1924, p. 454, fig. 12.

Occurrence. St. WS 243: Falkland Islands, 144–141 m.

REMARKS. Through the kindness of Dr Brøndsted I have been able to compare this specimen with the holotype and find an exact agreement in every way.

DISTRIBUTION. New Zealand.

Haliclona bilamellata, sp.n. (Plate XLVIII, figs. 5–9; Plate XLIX, figs. 1–3; Plate L, fig. 2; Fig. 6).

Holotype. B.M. 28. 2. 15. 121.

Occurrence. St. WS 27: South Georgia, 106–109 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 87: Falkland Islands, 96–127 m.; St. WS 99: Falkland Islands, 251–225 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 247: Falkland Islands, 172 m.

DIAGNOSIS. Sponge tubular, infundibular or bilamellate; texture elastic, very soft, somewhat friable; outer surface minutely hispid, shaggy, often thrown into irregular folds; inner surface even, minutely hispid, bearing numerous exhalant apertures varying up to 3 mm. in diameter; colour, in spirit, greenish yellow or brown; skeleton a regular isodictyal reticulation with bi- to trispicular primary fibres connected by transverse single spicules at regular intervals; oxea measuring 0·16 by 0·007 mm.

REMARKS. The holotype (Plate XLVIII, figs. 5, 6) is an incomplete sponge, apparently infundibular in life, bearing a strong resemblance to *Calyx* (*Gellius*) *imperialis* (Dendy)[1] from New Zealand, with which at first sight it might be easily confused. All the remaining specimens are damaged, though some only to a slight extent, and they vary from tubular to bilamellate.

The characteristic feature of the species is the external form. In many respects this is like that of *H.* (*Reniera*) *Scotti* (Kirkpatrick), but the sizes of the respective spicules differ too much to allow of a specific identity at the moment.

There are a number of other specimens which, in spite of the differences in external form, appear to belong to the same species. All have the same soft, friable texture, the same appearance and a very similar type of skeleton. The diversity in external form exhibited by them furnishes a good example of the extent to which the Chalinine sponges may vary.

The external form of these specimens is as follows:

Specimen 1. More or less pyriform with a deep cloaca, the walls of which are marked with large exhalant apertures. Surface minutely conulose. Colour dark brown (Fig. 6 *a*).

Specimen 2. Stipitate and tubular, with deep cloaca, the walls of which are marked with large exhalant apertures. Surface markedly conulose, particularly near the top of the sponge. Colour dark brown (Fig. 6 *b*).

Specimen 3. Sponge tubular in the lower two-thirds, infundibuliform above. Surface of lower two-thirds with long, slender spinose processes. Colour dark brown (Fig. 6 *c*).

Specimen 4. Sponge tubular. Surface covered with spinose processes (Plate XLIX, fig. 1).

Specimen 5. Sponge tubular. Surface covered with low, rounded, irregular ridges (rather like *Haliclona dancoi* (Topsent) in appearance). Colour yellow (Plate XLVIII, fig. 9).

[1] *Gellius imperialis*, Dendy, is a typical *Calyx*, differing from *C. arcuarius* (Topsent), described on page 277, in its external form and in the substitution of sigmata for toxa. In all other respects the two species are practically identical.

Specimen 6. Infundibular, 15 cm. high, 9 cm. across. Outer surface thrown into strongly developed rounded ridges. Colour dark brown (Plate XLVIII, figs. 5–8).

Specimen 7. Flabelliform, one surface pore-bearing with spinose processes: the other bearing oscules. Colour yellow (Plate XLIX, figs. 2–3).

With the exception of specimen 7, all have a deep cloaca with oscules measuring up to 4 mm. in diameter. The series also shows that the species has a range of form very like

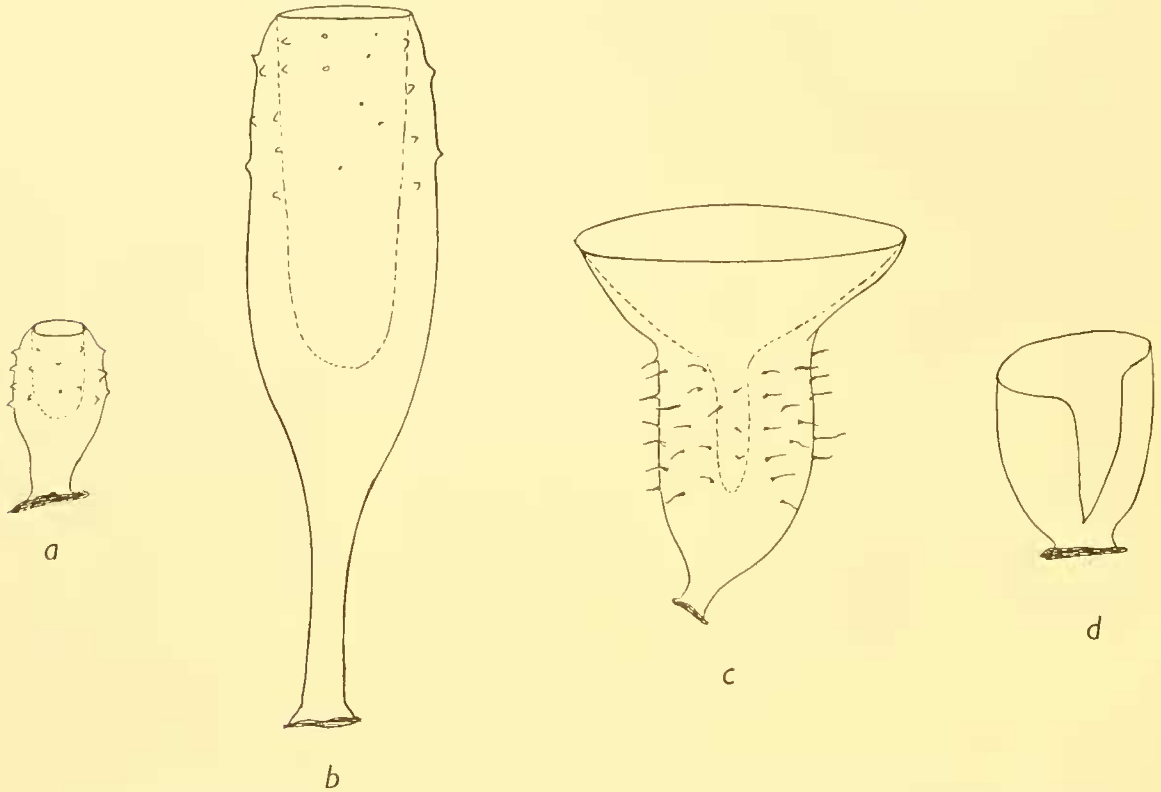

Fig. 6. Series showing external form in the smaller specimens of *Haliclona bilamellata*, sp.n. Dotted lines indicate shape and position of cloaca.

that of *Haliclona dancoi* (*sensu* Burton, 1929, p. 420), and differs from that species only in texture and the size of the spicules.

While the external form is similar in every case, two types of skeleton are found. In some specimens it is chalinoid and consists of a quadrangular network in which the primary fibres contain a double row of spicules coated with a thin layer of spongin and the secondary fibres contain one spicule only, the primary fibres being only one spicule length apart. The oxea in these forms vary from 0·132 to 0·18 by 0·007 to 0·008 mm. In the remaining specimens, the skeleton is pachychalinoid and consists of a quadrangular network of stout primary fibres, containing from eight to ten spicules serially arranged, but with very little spongin, and secondary fibres containing three or four spicules. The meshes of the network are from 0·3 to 0·4 mm. across and the spicules 0·240 by 0·01 mm. This separation into two types is, however, more apparent than real, for in the second group the skeleton may, in places, be identical with that of the first group, so that we have here definite evidence of the transition from a chalinoid to a pachychalinoid skeleton in one and the same species.

The species is very like *Haliclona flaccida* (Topsent), but this has spicules measuring 0·56 to 0·57 by 0·017 mm. As recorded above, however, there is considerable variation in the size of the spicules of *H. bilamellata*, and it is conceivable that the new species and *H. flaccida* may even yet prove to be identical; and possibly also synonymous with *H. dancoi*.

There are also four specimens, from Sts. WS 27, WS 86 and WS 99, which have oxea measuring 0·35 by 0·009 mm. and a skeleton, composed of primary lines 8–12 spicules thick and secondary lines 2–4 spicules thick, which gives a more fibrous appearance to the sponge (cf. Plate XLIX, figs. 2, 3). In external form, however, they show the same transitions from tubular to infundibular. One specimen in particular is worth attention, from St. WS 86. This is sub-infundibular, rather like a cup with a cut extending from rim to base (Fig. 6 *d*).

Haliclona stephensi, sp.n.

Holotype. B.M. 28. 2. 15. 102.

Occurrence. Saldanha Bay (beach).

Diagnosis. Sponge thinly encrusting (always?); surface smooth, even, minutely hispid; texture friable; colour, in spirit, yellow; skeleton an irregular network of single spicules, perhaps quadratic in places, with ill-defined polyspicular bundles usually running towards surface of sponge; oxea slightly curved, abruptly pointed, 0·12 by 0·006 mm.

Remarks. The single specimen, an incrustation several square centimetres in area, on a pebble, appears to agree closely with *Reniera* sp. from Reit's Bay described by Stephens (1915, p. 464).

Haliclona petrosioides, sp.n. (Fig. 7).

Holotype. B.M. 28. 2. 15. 434.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

Diagnosis. Sponge encrusting to massive and spreading; surface uneven, minutely hispid; texture friable; oscules and pores not apparent; colour, in spirit, white; skeleton a regular isodictyal network with primary and secondary lines five spicules thick, and with numerous isolated spicules scattered between meshes of main skeleton; spongin not apparent; oxea slightly curved, 0·154 by 0·007 mm.

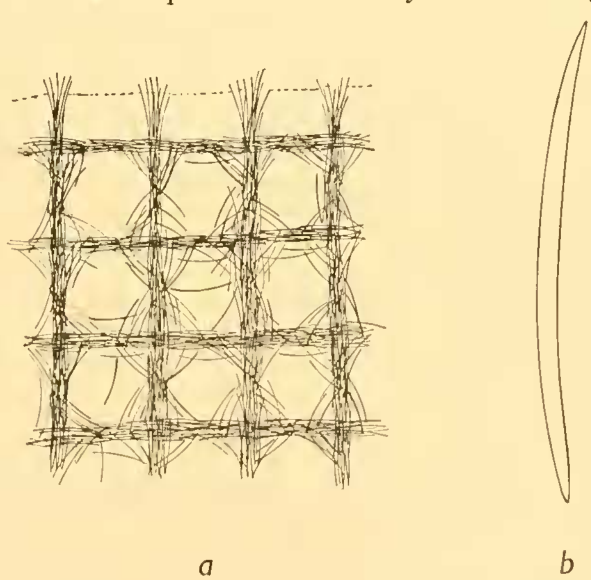

Fig. 7. *Haliclona petrosioides*, sp.n. *a*, section at righ angles to surface, showing structure of main skeleton × 60; *b*, an oxeote, × 400.

Remarks. The species appears to differ from all other species of *Haliclona* in the regularity and compactness of the skeleton, combined with the small size of the spicules. It appears to be most closely related to several of the varieties of *Petrosia similis*, Ridley and Dendy, from the Indian Ocean and the Kerguelen area.

Genus Haliclonissa, gen.n.

Genotype. H. verrucosa, sp.n.

Diagnosis. Haplosceridae with skeleton composed of fibres running vertically to surface, often anastomosing to form an irregular network, with numerous isolated spicules scattered between; without special dermal skeleton.

Remarks. The genus appears to be intermediate between *Haliclona* and *Microxina*.

Haliclonissa verrucosa, sp.n. (Plate LI, fig. 3; Fig. 8).

Holotype. B.M. 28. 2. 15. 473.

Occurrence. St. 180: Palmer Archipelago, 160 m.

Diagnosis. Sponge composed of stout, irregularly cylindrical branches, bearing a few conspicuous oscules 10 mm. in diameter; oscules leading out from shallow, capacious cloacae; surface verrucose; texture friable; colour, in spirit, pale yellow; skeleton composed of diffuse fibres, 6–20 spicules thick, running vertically to surface and forming in

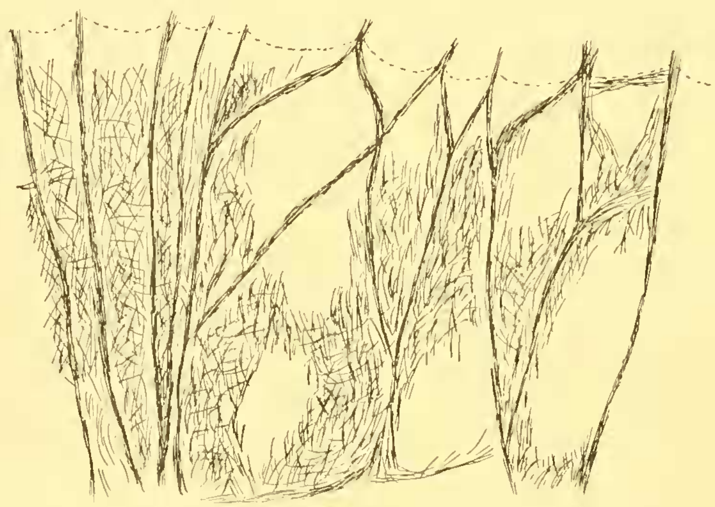

Fig. 8. *Haliclonissa verrucosa*, sp.n. Section at right angles to surface, to show structure of skeleton. × 10.

places an irregular network, with numerous isolated spicules scattered between; spongin inconspicuous; oxea slightly curved, tapering gradually to a point at each end, 0·5 by 0·017 mm.

Remarks. The holotype measures 13 cm. long by approximately 5 cm. in diameter. In places it is almost regularly cylindrical, but is mainly somewhat flattened laterally. It resembles in appearance some of the Antarctic species of *Isodictya* and also, to a lesser extent, *Hemigellius rudis* (Topsent), but the structure of the skeleton shows that it belongs to a different genus.

Haliclonissa sacciformis, sp.n. (Plate XLVIII, fig. 10; Fig. 9).

Holotype. B.M. 28. 2. 15. 621.

Occurrence. St. WS 223: Falkland Islands, 114 m.

DIAGNOSIS. Sponge sacciform, sessile, erect; surface soft to touch, minutely pilose, having an appearance of fine velvet; exhalant apertures opening into a deep central cloaca; texture very soft and compressible; colour, in spirit, yellowish grey; skeleton of stout multispicular primary fibres running vertically to surface, connected by diffuse and irregular secondary fibres, with numerous isolated spicules scattered between; spicules slender oxea measuring 0·32 by 0·007 mm.

Fig. 9. *Haliclonissa sacciformis*, sp.n. Section at right angles to surface. × 20.

REMARKS. The single specimen is laterally compressed, about 13 cm. high, 9 cm. across and 2·5 cm. wide, with a wide mouth at the apex leading into a deep and capacious cloaca. It resembles *Chalina spongiosissima*, Topsent closely in texture, but differs in the external form and the size of the spicules. The primary lines of the skeleton, too, are multispicular instead of bi- or trispicular.

Genus Microxina, Topsent

Microxina benedeni (Topsent) (Plate L, fig. 1; Fig. 10).

Gellius benedeni, Topsent, 1901, p. 6; *Gelliodes benedeni*, *id.*, *loc. cit.*, p. 16, pl. ii, fig. 3, pl. iii, fig. 5; *Microxina charcoti*, Topsent, 1916, p. 170; *id.*, 1917, p. 72, pl. i, fig. 3, pl. ii, fig. 3, pl. vi, fig. 17; *Gelliodes benedeni*, var. *fortior*, *id.*, 1917, p. 75, pl. ii, fig. 1, pl. vi, fig. 22; *G. benedeni*, Burton, 1929, p. 423; *Microxina charcoti*, *id.*, *loc. cit.*, p. 423.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 149: South Georgia, 200–234 m.; St. 190: Palmer Archipelago, 315 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 99: Falkland Islands, 251–225 m.; St. WS 248: Falkland Islands, 210–242 m.

REMARKS. The British Museum now possesses a considerable number of specimens of *Gelliodes benedeni* and *Microxina charcoti*, and from these it is clear that the two species are alike in external form and spiculation, except that the first possesses sigmata only, with the addition of raphides in the var. *fortior*, and the second has microxea only. This being the

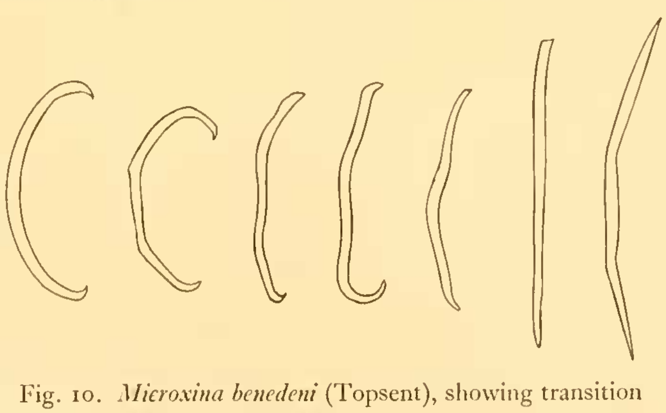

Fig. 10. *Microxina benedeni* (Topsent), showing transition from sigmata to microxea.

case, the suspicion that the two species are identical is unavoidable. The present specimens offer abundant evidence that this is in fact the case.

The Discovery collection contains eight specimens; five of these had been provisionally identified by me as *Microxina charcoti* and three as *Gelliodes benedeni*. On re-examination, I found that several of the former contained isolated long, slender raphides, and this was also the case in each specimen of the second species, but they were never grouped in dragmata as in *Gelliodes benedeni*, var. *fortior*. Secondly, one specimen of *G. benedeni* contained sigmata only, a second contained sigmata and an occasional microxeote, and the third contained all transitions from sigmata to microxea (Fig. 10). In addition, it is worth noting that the sigmata in *Gelliodes benedeni* are frequently centrotylote, like the microxea of *Microxina charcoti*. It is evident therefore that we have to deal here with a single species, the microscleres of which may be sigmata and/or microxea, to which raphides, either isolated or in dragmata, may be added.

Distribution. Graham Land; Victoria Land; Wilhelm Land.

Genus Hemigellius, gen.n.

Genotype. Gellius rudis, Topsent.

Diagnosis. Haploscleridae with skeleton composed of a coarse and irregular reticulation of oxea formed by multispicular primary fibres, running vertically to surface, and uni- or multispicular connecting fibres; special dermal skeleton formed by ends of primary fibres spreading out beneath ectosome in a paniculate manner; microscleres, when present, sigmata.

Remarks. The original description gives little information regarding the structure of the skeleton in *Gellius rudis* (see Topsent, 1901, p. 14); but the surface is said to be finely hispid, which at least indicates the absence of a tangential dermal skeleton. Kirkpatrick's (1908) specimens assigned to this species resemble the holotype sufficiently, however, to justify the framing of a diagnosis, as has been done here, on the characters observed in his specimen.

The genus is closely allied to *Haliclona*.

Hemigellius rudis (Topsent).

Gellius rudis, Topsent, 1901, p. 6; *id.*, 1901, p. 14, pl. i, fig. 9, pl. iii, fig. 4; *id.*, 1907, p. 77, pl. iii, fig. 2; *G. fimbriatus*, Kirkpatrick, 1907, p. 86; *G. rudis*, *id.*, 1908, p. 45, pl. xvii, fig. 1; *G. fimbriatus*, *id.*, *loc. cit.*, p. 46, pl. xvii, fig. 2, pl. xxiv, fig. 2; *G. rudis*, Hentschel, 1914, p. 287; Burton, 1929, p. 422.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 42: South Georgia, 120–204 m.; St. 170: Clarence Island, 342 m.

Remarks. In a former work (*loc. cit.*) I included *Gellius pilosus*, Kirkpatrick, and *G. tenellus*, Topsent, as synonyms of this species. As shown on p. 276 the latter is now included in the genus *Adocia*. As regards *G. pilosus*, Kirkpatrick, there can be little doubt that it is congeneric with *Hemigellius rudis* (Topsent), but whether it is conspecific is not so certain, and it is perhaps preferable to recognize it as a distinct species.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Hemigellius pachyderma, sp.n. (Plate XLVIII, fig. 4; Fig. 11).

Holotype. B.M. 28. 2. 15. 723.

Occurrence. St. WS 210: Falkland Islands, 161 m.

DIAGNOSIS. Sponge consisting of massive cylindrical branches; surface even, minutely hispid; texture friable; oscules conspicuous, 3–4 mm. in diameter, scattered irregularly

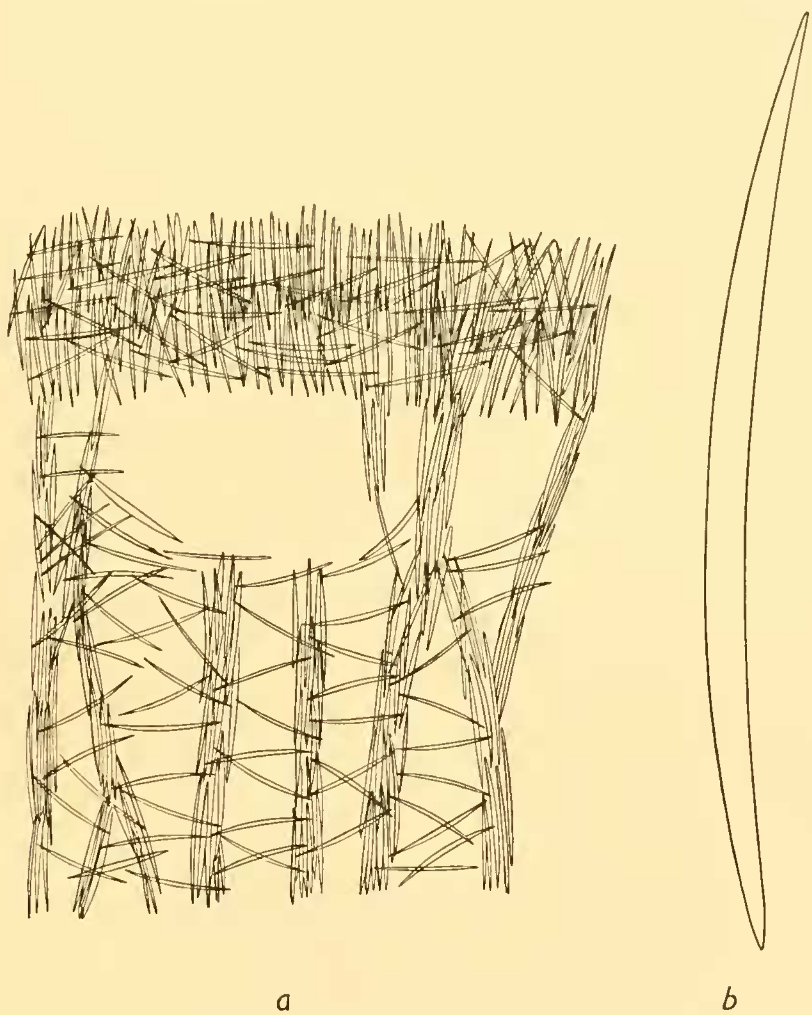

Fig. 11. *Hemigellius pachyderma*, sp.n. *a*, section at right angles to surface, showing structure of main skeleton, × 30; *b*, oxeote, × 400.

over surface; pores apparently evenly distributed; subdermal cavities large; colour, in spirit, greyish yellow; skeleton a reticulation consisting of stout spicule bundles, 5–7 spicules thick, running towards surface and anastomosing slightly, connected by isolated spicules set at varying angles; main vertical fibres ending immediately beneath surface in a dense subdermal palisade; oxea slightly curved, measuring 0·28 by 0·014 mm.

REMARKS. The holotype consists of two fragments, the one a small portion of a cylindrical branch, and the other a cylindrical branch, 2 cm. in diameter, which bifurcates at one end into two short branches rounded at the ends. The second specimen is in fact almost identical in appearance with the specimen figured by Kirkpatrick (1908, pl. xvii, fig. 1) under *Gellius rudis*, Topsent.

Hemigellius pachyderma, sp.n., differs from *H. rudis* (Topsent) mainly in the size of the spicules, in the absence of sigmata, and in the dense aggregation of spicules immediately beneath the dermis. But all these characters are comparative, and it may possibly be shown eventually that the two species are synonymous. In any case, the dermal palisade may certainly be accepted as the homologue of the paniculate surface brushes in *H. rudis*.

Genus Adocia, Gray

Adocia carduus (Ridley and Dendy).

Gellius carduus, Ridley and Dendy, 1886, p. 333; *G. laevis*, *id.*, *loc. cit.*, p. 333; *G. carduus*, *id.*, 1887, p. 39, pl. viii, fig. 3, pl. xiii, fig. 7; *G. carduus*, var. *magellanica*, *id.*, *loc. cit.*, p. 40, pl. xiii, fig. 6; *G. laevis*, *id.*, *loc. cit.*, p. 40, pl. xiii, fig. 8.

Occurrence. St. 160: near Shag Rocks, 177 m.; St. 177: South Shetlands, 1080 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 83: Falkland Islands, 137–129 m.

REMARKS. Judging from the observations made on the new material, there is no possibility of distinguishing between *Gellius carduus* and its variety *magellanica* and *G. laevis*. The external form of the new specimens resembles, in each case, that of *G. carduus*, var. *magellanica*. The megascleres, which vary from oxea to incipient strongyla, measure from 0·3 to 0·45 mm. long, and the sigmata vary from 0·015 to 0·02 mm. chord.

DISTRIBUTION. Crozet Island; Prince Edward Island; Marion Island; Magellan Straits; mouth of the Rio de la Plata.

Adocia glacialis (Ridley and Dendy).

Gellius glacialis, Ridley and Dendy, 1886, p. 333; *id.*, 1887, p. 41, pl. viii, fig. *u*, pl. xiii, figs. 1, 15, 19; *G. glacialis*, var. *nivea*, *id.*, *loc. cit.*, p. 42, pl. viii, fig. 8, pl. xiii, figs. 4, 12; Kirkpatrick, 1908, p. 49, pl. xvii, fig. 4; Burton, 1929, p. 397.

Occurrence. St. 140: South Georgia, 122–136 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 82: Falkland Islands, 140–144 m.; St. WS 83: Falkland Islands, 137–129 m.

REMARKS. Comparison of the present specimens with those in the Swedish Antarctic Collection and with the types of both the species and its variety has shown that the var. *nivea* cannot be maintained. The question will be dealt with fully in my forthcoming report on the sponges of the Swedish Antarctic Expedition.

The sigmata in one of the present specimens resemble those of *A.* (*Gellius*) *flagellata* (Ridley and Dendy).

DISTRIBUTION. Agulhas Bank; Prince Edward Isle; Victoria Land.

A comparison between A. carduus *and* A. glacialis

On comparing the types of *Gellius carduus*, *G. carduus*, var. *magellanica*, *G. laevis*, *G. glacialis* and *G. glacialis*, var. *nivea*, I find that there is no real difference between them in external form or in the structure of the skeleton. The only distinction that can be made rests on the differences in the dimensions of the spicules, especially of the microscleres. I have already suggested that this group of three species and two varieties represents no more than two species, so that the differences between these two species may be expressed in the following way:

G. carduus: Oxea 0·49–0·6 mm. long; sigmata 0·02 mm. chord.

G. glacialis: Oxea 0·53–0·65 mm. long; sigmata up to 0·145 mm. chord.

It is evident from the examination of specimens which have come to hand since these species were first described that the sigmata in *G. glacialis* rarely measure so much as 0·145 mm. Sigmata are always present measuring 0·02 mm. and, in addition, larger sigmata measuring 0·06, 0·07, 0·08, up to 0·12 mm. or so. Further, the larger and smaller sigmata are not differentiated into two distinct categories, but are connected by numerous forms intermediate in size. I suspect therefore that the species called here *Adocia carduus* is merely a form of *A. glacialis* in which the larger sigmata have dropped out. It may be necessary to regard them ultimately as conspecific, but I would like to have more material for examination before taking this step.

There is, however, another point to be noted: that in the present collection there is nearly a score of specimens from Sts. 160 and 177 which have the same general appearance as *A. carduus* and *A. glacialis*, the same arrangement of the skeleton, and the same type of megascleres (i.e. oxea varying from abruptly pointed to sub-strongylote). All these specimens are clearly conspecific and obviously belong either to *A. carduus* or to *A. glacialis*, but to which it is quite impossible to say since none of them possesses a single microsclere. It seems to me therefore that in this group of specimens from Sts. 160 and 177, we have a number of individuals in which the reduction of the microscleres, believed to have taken place in *A. carduus*, has been taken a step further by the complete suppression of all microscleres.

Adocia siphonella (Thiele).

Reniera siphonella, Thiele, 1905, p. 460, figs. 75, 97–99.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

Remarks. The spicules in this specimen are usually strongyla, with a few oxea, measuring 0·32 by 0·018 mm. Only a few fragments are to hand, but from these it appears that, if my identification is correct, the species belongs to *Adocia*. Through the kindness of Dr Arndt, of the Berlin Museum, I have been able to compare the present specimen with one of the types, but as this also is in a fragmentary condition it does not help in determining the generic position of the species.

Distribution. Calbuco, Chile.

Adocia cucurbitiformis (Kirkpatrick).

Gellius cucurbitiformis, Kirkpatrick, 1907, p. 288; *id.*, 1908, p. 48, pl. xvii, fig. 5, pl. xxiv, fig. 5.

Occurrence. St. 180: Palmer Archipelago, 160–330 m.

DISTRIBUTION. Victoria Land.

Adocia tremulus (Topsent).

Gellius tremulus, Topsent, 1916, p. 171; *id.*, 1917, p. 79, pl. i, fig. 7, pl. vi, fig. 20.

Occurrence. St. 175: South Shetlands, 200 m.

REMARKS. The specimen is quite typical except that no raphides are present.

DISTRIBUTION. Graham Land.

Adocia tenellus (Topsent).

Gellius tenellus, Topsent, 1916, p. 171; *id.*, 1917, p. 80, pl. vi, fig. 23.

Occurrence. St. WS 88: Falkland Islands, 96–127 m.

REMARKS. There is a doubt about the locality in this case so that it would be inadvisable to say much concerning the bearing that this specimen may have on the value of the species or its distribution. The specimen itself is massive, with spicules of the same shape and dimensions as those of the holotype of *Gellius tenellus*, and the skeleton is a unispicular network throughout.

DISTRIBUTION. Petermann Islands.

"Gellius fibulatus."

Occurrence. St. WS 82: Falkland Islands, 140–144 m.

REMARKS. The specimen recorded under this title is a small massive sponge, of a very friable texture, which reached me in a fragmentary and slightly macerated condition. It appears to belong to *Adocia*, but of this it is impossible to be sure. The skeleton is a unispicular, occasionally bispicular, network of oxea measuring 0·12 by 0·008 mm., slightly curved and gradually and evenly pointed towards each end. The sigmata are of the usual type and measure up to 0·05 mm. chord.

Reniera fibulatus, Schmidt (= *Gellius fibulatus*, Autt.), is a species of which we know nothing with certainty. The holotype has not been seen since Schmidt first described it, and the original description is hopelessly inadequate. All we know is that its skeleton was composed of oxea and sigmata, but the sizes of these respective spicules are unknown. Since Schmidt first established the species, it has been used by succeeding authors for almost any sponge possessing small oxea and sigmata, so that, in the conventional sense, the present sponge belongs to Schmidt's species.

The only reason for recording such a poorly preserved specimen is that it is from a locality from which we have very few records and there is just the hope that, when the so-called species "*Gellius fibulatus*" has been correctly split into its component parts, we may be able to determine this particular specimen with certainty.

Genus Calyx, Vosmaer

Calyx arcuarius (Topsent).

Gellius arcuarius, Topsent, 1913, p. 638, pl. vi, fig. 11; *Calyx stipitatus*, *id.*, 1916, p. 171; *id.*, 1917, p. 81, pl. iv, fig. 13, pl. vi, fig. 24; Burton, 1929, p. 422, pl. v, figs. 5, 6.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 148: South Georgia, 132–148 m.; St. 149: South Georgia, 200–234 m.; St. 159: South Georgia, 160 m.; St. 160: Shag Rocks, 177 m.; St. 163: South Orkneys, 18–27 m.; St. 175: South Shetlands, 200 m.

REMARKS. There are several specimens which correspond closely with the original description of *Calyx stipitatus* and with the specimens recorded by me under that name in 1929. They are all thinly flabellate, the largest 40 cm. high and about the same across, with evenly rounded margins, often with rounded outgrowths springing from the main body. The surface is even, glabrous or only minutely hispid. The skeleton is composed of stout bundles of oxea, usually 20–40 deep, running from base to margin, branching and anastomosing, with a confused triangular network of single spicules filling the spaces between the bundles. The dermal skeleton is a tangential unispicular network, in which the spicules are often irregularly set so that the ends frequently project slightly at the surface. In this way, although there is a special dermal skeleton comparable with that found in *Adocia*, the surface is minutely hispid. The oxea vary from 0·18 to 0·28 mm. long by 0·011 to 0·018 mm. thick.

The external form varies from branching, as in the specimen figured by me (*loc. cit.*, pl. v, fig. 6), to flabellate, and the disposition of the oscules may be on one of two plans, a few conspicuous oscules (cf. Burton, *loc. cit.*, pl. v, figs. 5, 6) or numerous small oscules scattered over one surface only (cf. Topsent, 1917, pl. iv, fig. 13). I was wrong therefore in regarding the "orifices circulaires" (1929, p. 422) as due to commensal cirripedes.

Calyx arcuarius, Topsent, is a species of varied form, with a dimorphic system of exhalant apertures, and these different variations are well shown in the present series of specimens. On the other hand, the main skeleton is constant in structure and forms a character by which the species may be readily recognized. There can therefore be no doubt that all the specimens before me at the moment are conspecific. In view of this, the following observation is of particular interest; namely, that some of these specimens have abundant toxa, 0·07–0·1 mm. long, some only a few, and some appear to be entirely without them. It is obvious then that *Gellius arcuarius*, Topsent, and *Calyx stipitatus*, Topsent, are synonymous, the holotype of the former being a fragment of a large flabellate sponge having toxa in abundance, and the holotype of the latter being an incomplete specimen having no toxa. We have to accept, as a consequence, the following facts: that the members of the genus *Calyx*, a genus hitherto regarded as characterized by the absence of microscleres, may possess toxa; that the absence of a particular microsclere has, *per se*, no taxonomic value.

DISTRIBUTION. South Orkneys; Victoria Land.

Calyx kerguelensis (Hentschel).

Gelliodes kerguelensis, Hentschel, 1914, p. 127, pl. viii, fig. 11.

Occurrence. St. 58: Falkland Islands, on piles of Government Jetty; St. 140: South Georgia, 122–136 m.

Remarks. This species, represented in the collection by a piece of a stout, cylindrical sponge, has a skeleton very similar to that of *C. arcuarius* except that the dermal skeleton is somewhat more diffuse.

In the present specimen, the sigmata measure, for the most part, up to 0·04 mm. chord, but a few measure up to 0·1 mm.

Distribution. Kerguelen.

Genus Dasychalina, Ridley and Dendy.

Genotype. D. fragilis, Ridley and Dendy.

Diagnosis. Haplosceridae with dermal skeleton composed of an irregular multispicular reticulation subdivided into primary and secondary meshes; main skeleton of stout multispicular fibres, or systems of anastomosing fibres, with numerous isolated spicules scattered between; spongin absent or present in very small quantities.

Remarks. This genus, established by Ridley and Dendy (1886, p. 329), was abandoned by them (1887) because of a suspected identity with *Pachychalina*, Schmidt. The characters of the latter are, however, unknown to us, and because *Dasychalina fragilis* differs in the structure of its skeleton from other species of "*Pachychalina*" Autt., it is proposed here to revive the use of the name. *Dasychalina* is intermediate between *Adocia* and *Callyspongia* (= "*Pachychalina*", Autt.).

Dasychalina validissima (Thiele) (Plate L, figs. 3–7; Fig. 12).

Pachychalina validissima, Thiele, 1905, p. 473, figs. 16, 91; *Halichondria magellanica*, Dendy, 1924, p. 325.

Occurrence. St. 51: Falkland Islands, 115 m.; St. 53: Falkland Islands, 0–2 m.; St. 140: South Georgia, 122–136 m.; St. WS 73: Falkland Islands, 121 m.; St. WS 76: Falkland Islands, 205–207 m.; St. WS 77: Falkland Islands, 110–113 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 109: Falkland Islands, 145 m.; St. WS 233: Falkland Islands, 185–175 m.; St. WS 237: Falkland Islands, 150–256 m.; St. WS 243: Falkland Islands, 144–141 m.

Remarks. The specimens may be massive, as in the holotype, massively branched, with branches cylindrical or flattened, or flabellate (Pl. L, figs. 3–7), while the surface may be smooth, tuberculate or spinose. The skeleton varies from that shown in Fig. 12 *a* to that in Fig. 12 *b*. In spite of the difference in appearance, these two types of skeleton structure are essentially the same. In the holotype (Fig. 12 *a*) the skeleton consists of a reticulation of stout multispicular fibres, with numerous isolated spicules scattered between, but in most of the present specimens (Fig. 12 *b*) the multispicular fibres are resolved into anastomosing systems of smaller fibres. There are,

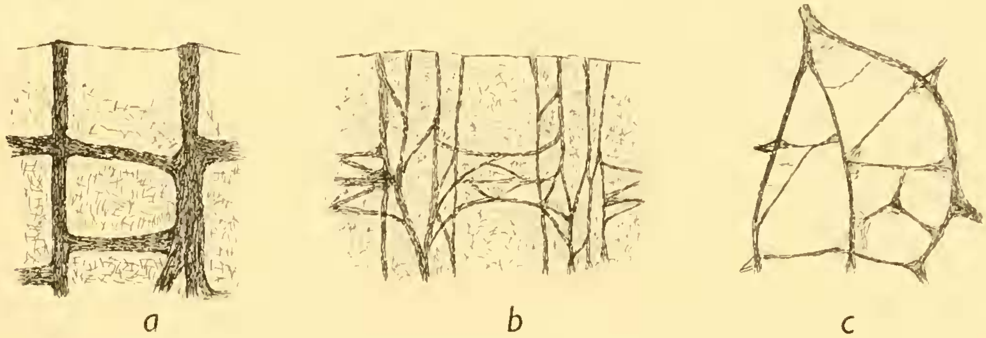

Fig. 12. *Dasychalina validissima* (Thiele). *a*, *b*, sections at right angles to surface (*a* is from holotype); *c*, dermal skeleton. All × $7\frac{1}{2}$.

however, all gradations between these two extremes. The oxea measure 0·15–0·32 mm. long.

DISTRIBUTION. Calbuco; Straits of Magellan.

Genus Callyspongia, Duchaissang and Michelotti.

Callyspongia fortis (Ridley) (Figs. 13, 14).

Siphonochalina fortis, Ridley, 1881, p. 111, pl. x, fig. 3.

Occurrence. St. WS 72: Falkland Islands, 95 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 86: Falkland Islands, 157–147 m.

DIAGNOSIS. Sponge sub-ramose to lobose; surface minutely conulose; oscules large, conspicuous, situated on crater-like projections or with margins level with surface, in all cases leading into deep cloacae receiving large exhalant canals which penetrate body of sponge; pores apparently scattered in meshes of dermal skeleton; skeleton differentiated into main and dermal; main skeleton consisting of a coarse-meshed network of stout spongin fibres, often 0·3 mm. thick, containing an axial row of spicules, multispicular in primary fibres, unispicular in secondary fibres; meshes of main skeleton ranging from 0·4 to 1·2 mm. across; dermal skeleton a tangential network of fibres differentiated into primary, secondary and tertiary fibres; primary fibres stout, of similar dimensions to those of main skeleton; mesh usually triangular, but may be quadrate or polygonal and divided into secondary and tertiary meshes; dimensions of latter usually no more than a spicule length across; spicules oxea, straight, 0·066 by 0·006 mm.

REMARKS. The species is characterized by its external form and by the small size of its spicules.

The inadequacy of *Ceraochalina*, as a genus for the reception for all Chalininae in which the spicules are vestigial, is shown by one specimen in which the fibres of the

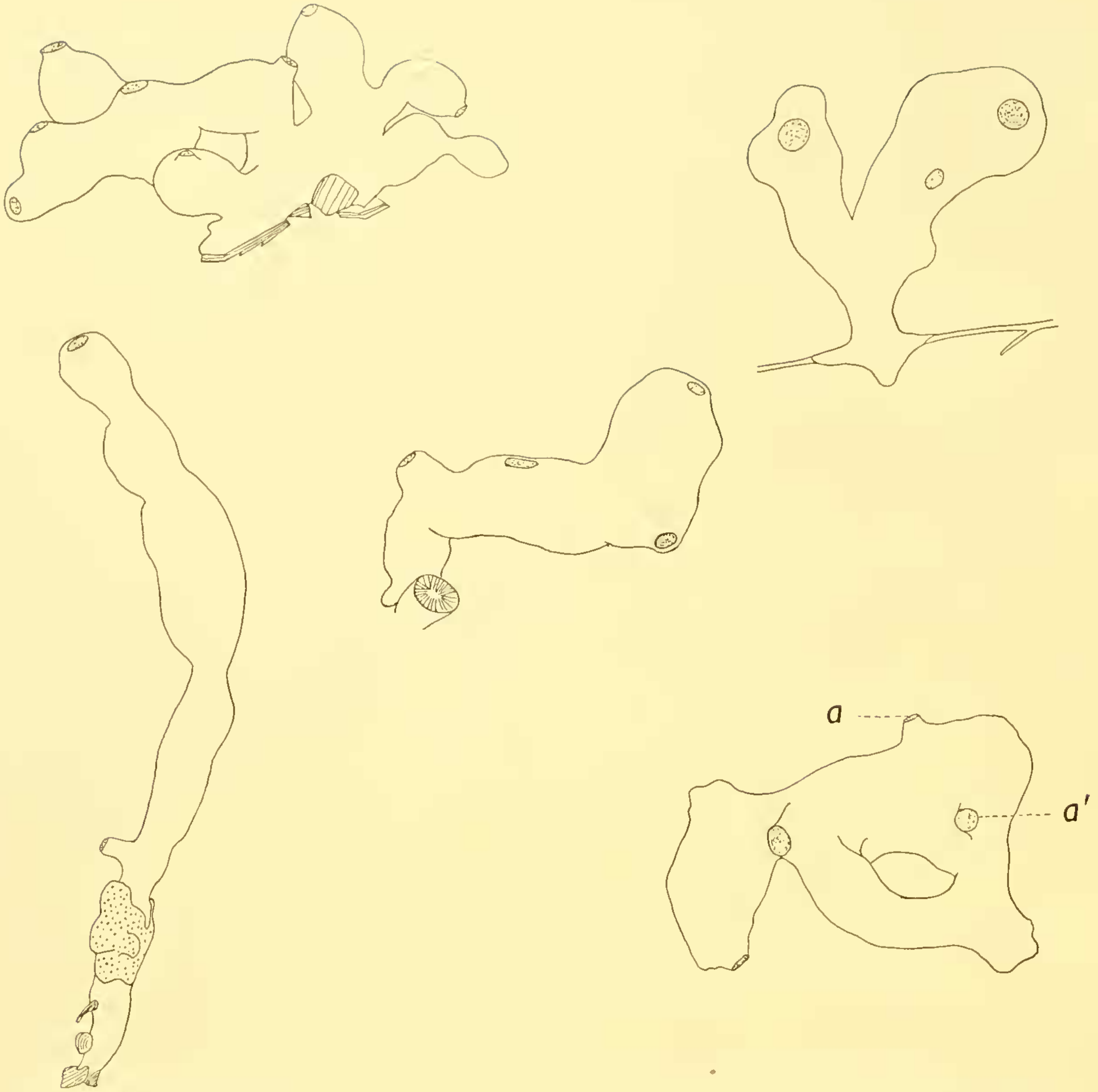

Fig. 13. *Callyspongia fortis* (Ridley). To show variation in form. All figures × $\frac{2}{3}$. For the sake of clearness the oscules are marked by dotted areas (*a* and *a′* are oscules not yet opened).

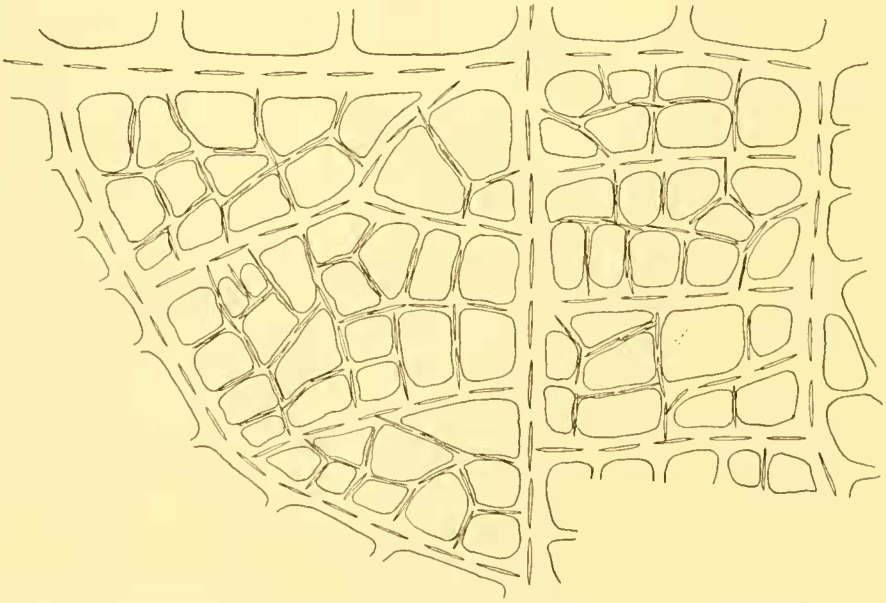

Fig. 14. *Callyspongia fortis* (Ridley). Portion of tangential dermal skeleton. × 100.

main skeleton contain only feebly developed spicules, measuring 0·052 by 0·002 mm., while the dermal skeleton contains only normal spicules, measuring 0·06 by 0·006 mm.

In the same way, the inadequacy of *Siphonochalina*, as a genus for the reception of all tubular Chalininae, is shown by the fact that, while the remainder of the specimens are sub-ramose or lobate, one is erect and tubular, with an apical osculum and a deep cloaca running the length of the body, and two accessory lateral oscula near the base.

DISTRIBUTION. Chile.

Callyspongia fusifera (Thiele) (Plate LII, fig. 1; Figs. 15, 16).

Chalina fusifera, Thiele, 1905, p. 476, figs. 15, 32, 95.

Occurrence. St. WS 77: Falkland Islands, 110–113 m.; St. WS 86: Falkland Islands, 157–147 m.

REMARKS. The specimen assigned to this species is palmo-digitate (see Plate LII, fig. 1) and comparison of the figure given with that given for the holotype (Thiele, *loc. cit.*, fig. 15) shows that the two specimens have a similar appearance although the shape

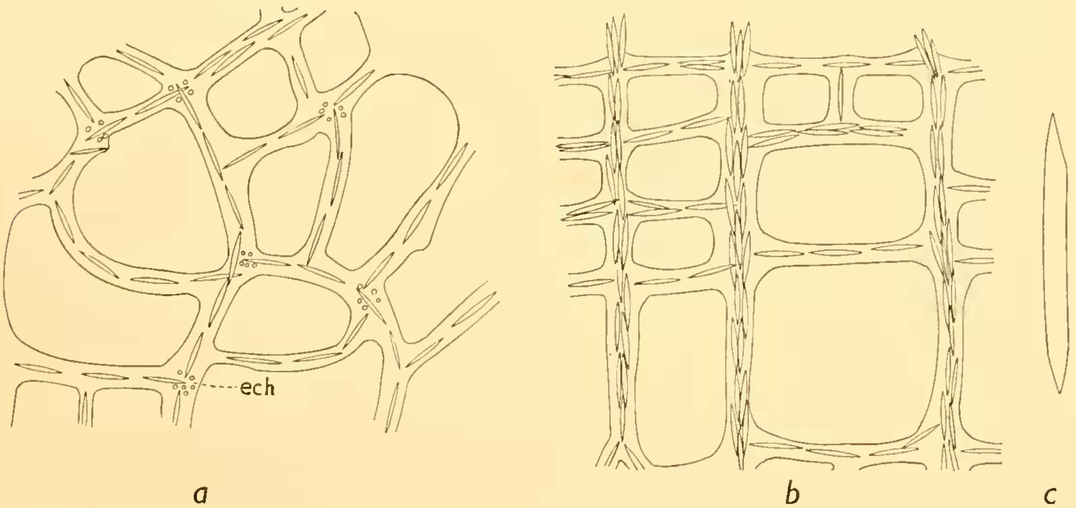

Fig. 15. *Callyspongia fusifera* (Thiele). Falkland Islands specimen. *a*, dermal skeleton, × 100; *b*, main skeleton, × 100; *c*, oxeote, × 400; *ech*, echinating tufts of spicules seen in section.

is not identical. On the other hand, the arrangement of the dermal skeleton and the shape of the spicules differ considerably in the two specimens. Through the kindness of Dr W. Arndt, I have been able to examine a piece of the holotype and have found that the dermal skeleton is a close-meshed reticulation showing an incipient differentiation into primary and secondary meshes. The main skeleton is a coarse and large-meshed reticulation with multispicular primary fibres and unispicular secondary fibres. The spicules are 0·06 mm. long and rounded at the ends, although not forming pure strongyla. The dermal skeleton of the present specimen does not show so marked a differentiation into primary and secondary fibres even as the holotype. The main skeleton is a close-meshed reticulation with bispicular primary fibres and unispicular secondary fibres, and the dermal skeleton is echinated at the nodes by tufts of spicules projecting from the ends of the primary fibres of the main skeleton. The spicules are oxea measuring 0·14 by 0·01 mm. A comparison of Figs. 15 and 16 will show clearly the obvious way in which the skeleton of the present specimen differs from that of the type. In fact, there might be something to be said in favour of regarding the two specimens as specifically different, but for the fact that the differences they exhibit can be shown by

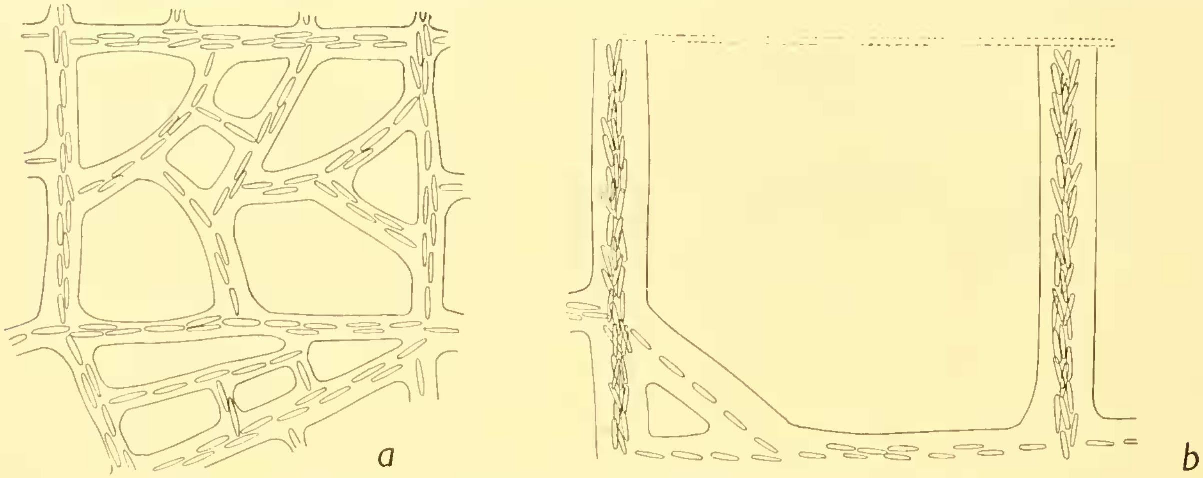

Fig. 16. *Callyspongia fusifera* (Thiele). Holotype. *a*, dermal skeleton, × 66; *b*, main skeleton, × 66.

comparison with the known variations in other species of *Callyspongia* to be unimportant, and also by the fact that the co-types of the species are to an extent intermediate between these two specimens. In the specimen from Calbuco, for example, the spicules are almost identical in shape with those of the Discovery specimen, though slightly smaller. Unfortunately, I have no information as to the structure of the skeleton in the co-types, but it is probable that intermediate characters will be found in this too. The co-type from Punta Arenas has oxea measuring 0·24 mm. long, considerably longer than those of the present specimen.

Distribution. Calbuco; Tumbes; Punta Arenas.

Callyspongia flabellata, sp.n. (Plate XLIX, fig. 4; Fig. 17).

Holotype. B.M. 28. 2. 15. 359.

Occurrence. St. WS 81: Falkland Islands, 81–82 m.

Diagnosis. Sponge flabellate, pedunculate; surface even, minutely hispid; oscules numerous, 1–2 mm. in diameter, mainly disposed in an irregular linear series along margins of sponge; pores apparently distributed generally over surface; colour, in spirit, greyish yellow; main skeleton irregularly isodictyal, uni- or multispicular; dermal skeleton a tangential network of fibres, similar to those of main skeleton, echinated at nodes by tufts of spicules projecting at right angles; spicules oxea, straight, smooth, 0·105 by 0·009 mm.

Remarks. The dermal skeleton is not easily detected. It cannot be readily removed, as is usual in other Chalininae with a special dermal skeleton, and the fact that its nodes are echinated by tufts of spicules makes it appear as though the sponge were a true

Haliclona, devoid of special dermal skeleton and with the primary fibres of the main skeleton continued outwards beyond the ectosome. Sections of the sponge, taken at

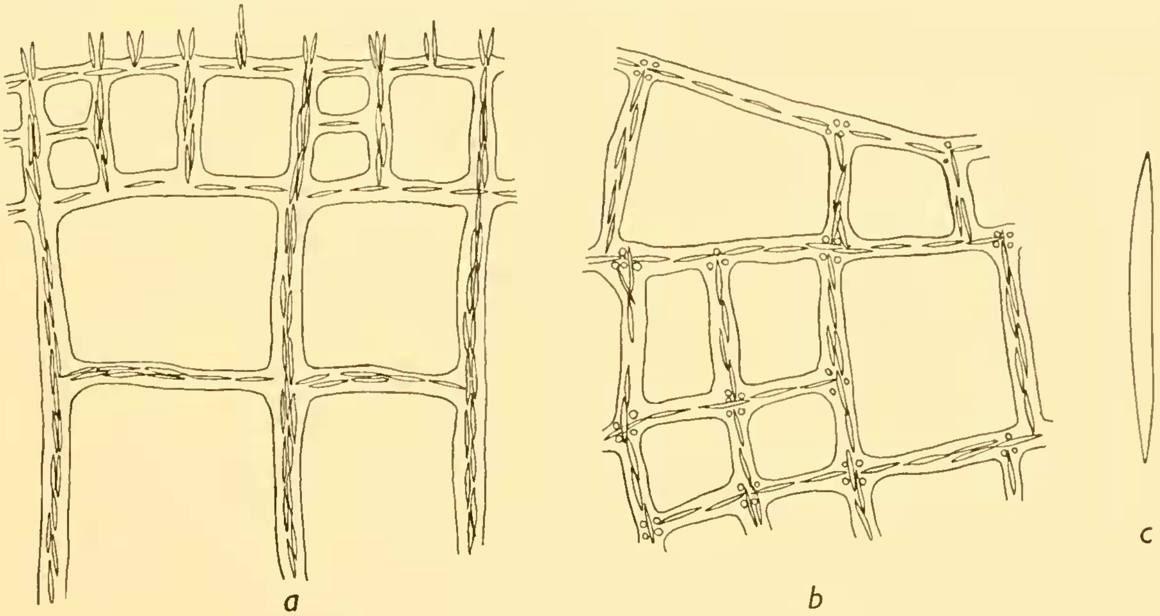

Fig. 17. *Callyspongia flabellata*, sp.n. *a*, section at right angles to surface, × 60; *b*, dermal skeleton, × 60; *c*, oxeote, × 400.

right angles to the surface, show, however, even to the naked eye, that there is a definite and unmistakable dermal skeleton. This is the more readily apparent since the interior of the sponge is cavernous and the ectosome compact and firm.

The species is characterized mainly by its external form.

Genus **Phloeodictyon**, Carter

Phloeodictyon eumitum, Kirkpatrick.

P. eumatum (*sic*), Kirkpatrick, 1903, p. 253, pl. v, fig. 18, pl. vi, fig. 19 (the name is spelt *eumitum* on p. 235, and in the explanation to the plates).

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DISTRIBUTION. Natal.

Family DESMACIDONIDAE

Section *ISODICTYEAE*

Genus **Isodictya**, Bowerbank

Isodictya kerguelensis (Ridley and Dendy).

Homoeodictya kerguelensis, Ridley and Dendy, 1886, p. 346; *id.*, 1887, p. 110, pl. xxiii, fig. 3, pl. xxiv, fig. 3; *Desmacidon kerguelensis*, Topsent, 1908, p. 24; *Homoeodictya kerguelensis*, *id.*, 1917, p. 67.

Occurrence. St. WS 79; Falkland Islands, 131–132 m.

DISTRIBUTION. Kerguelen; Graham Land.

Isodictya kerguelensis, var. simillima (Hentschel).

Homoeodictya kerguelensis, var. *simillima*, Hentschel, 1914, p. 80, pl. vi, fig. 7.

Occurrence. St. WS 109; Falkland Islands, 145 m.

Distribution. Wilhelm Land.

Isodictya setifer (Topsent).

Desmacidon setifer, Topsent, 1901, p. 6; *id.*, 1901, p. 17, pl. i, fig. 3, pl. iii, fig. 6; *Desmacidon spinigera*, Kirkpatrick, 1907, p. 283; *id.*, 1908, p. 39, pl. xix, fig. 3, pl. xxiii, fig. 3; *Desmacidon setifer*, Topsent, 1908, p. 26; *Homoeodictya verrucosa*, *id.*, 1913, p. 636, pl. v, fig. 1, pl. vi, fig. 13; *H. setifera*, *id.*, *loc. cit.*, p. 637; *H. obliquidens*, Hentschel, 1914, p. 79, pl. iv, fig. 7, pl. vi, fig. 6; *H. setifera*, *id.*, *loc. cit.*, p. 81; *H. setifera*, Topsent, 1917, p. 65, pl. vi, fig. 12; *H. trigona*, *id.*, *loc. cit.*, p. 66; *Desmacidon spinigera*, Brondsted, 1926, p. 3; *Isodictya spinigera*, Burton, 1929, p. 424; *I. verrucosa*, *id.*, *loc. cit.*, p. 424.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 42: South Georgia, 120–204 m.; St. 143: South Georgia, 273 m.; St. 144: South Georgia, 155–178 m.; St. 148: South Georgia, 132–148 m.; St. 149: South Georgia, 200–234 m.; St. 159: South Georgia, 160 m.; St. 160: Shag Rocks, 177 m.; St. 175: South Shetlands, 200 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 73: Falkland Islands, 121 m.; St. WS 77: Falkland Islands, 110–113 m.; St. WS 80: Falkland Islands, 152–156 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 99: Falkland Islands, 251–225 m.; St. WS 109: Falkland Islands, 145 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 248: Falkland Islands, 210–242 m.

Remarks. There are 32 specimens in the collection which belong, in my opinion, to the same species, namely *Isodictya setifer* (Topsent). They all resemble each other strongly externally, and have much the same appearance as that of the holotype of *Homoeodictya verrucosa*, Topsent (1913, pl. v, fig. 1). The form is massive to lobose, often stipitate. In spiculation they agree also in having a main skeleton of oxea and, for microscleres, isochelae palmatae, which have the peculiarity that they are often contorted and distorted and the palms are sometimes obliquely directed. This peculiarity of the microscleres has been overlooked in many cases, as for example in *Desmacidon spinigera*, Kirkpatrick, although Topsent and Hentschel drew attention to it in *Desmacidon setifer* and *Homoeodictya obliquidens* respectively. The reason for this seems to be that the contortion and distortion are most marked in the smaller spicules, that is in those least easily seen, and will only be noticed if the microscleres are numerous and the eye happens to catch one in an isolated position in the preparation lying in a particularly favourable angle for examination. At all events, I have satisfied myself that such microscleres are present in the type of *Desmacidon spinigera*, Kirkpatrick, and that they are present in varying proportions in the specimens of the present collection. It often happens, of course, that a particular individual may have a greater proportion of normal chelae than abnormal, and were one not looking particularly for contorted or distorted microscleres these would be completely overlooked. I have no doubt therefore that in the types of *Homoeodictya verrucosa*, Topsent, and other species in the above list of synonyms in which abnormal chelae have not been recorded, these same peculiar chelae are present, though probably in small quantities.

With regard to the types of *Desmacidon setifer*, *D. spinigera*, *Homoeodictya trigona*, *H. verrucosa* and *H. obliquidens* we may say that in external appearance there is literally nothing to choose between them. In the arrangement of the spicules in the main skeleton there is the same similarity, and in the shape of the microscleres there are the same peculiarities. It is only in the dimensions of the spicules, and more particularly of the megascleres, that distinctions may be made between them. The dimensions of the spicules are as follows:

	Oxea (mm.)	Chelae (mm.)
D. setifer	0·880–1·0	0·023–0·03
D. spinigera	0·731	0·024
H. trigona	0·740	0·060–0·07
H. verrucosa	0·52	0·027–0·037
H. obliquidens	0·528–0·672	0·038–0·055

The variation in the dimensions of the oxea in these five forms is from 0·52 to 1·0 mm., and in the chelae from 0·023 to 0·07 mm. This, on the face of it, is quite a considerable range. On the other hand, the five forms afford a convenient series of intermediates from one extreme of measurement to the other, both in the oxea and in the chelae, and it is obvious that if a large collection of specimens were examined and an attempt made to divide them into species on the basis of spicule measurement, the attempt would prove to be impossible. This is actually what has happened in the case of the Discovery specimens, in which the average measurements of the spicules range as follows: oxea 0·35–0·7 by 0·01–0·025 mm., and chelae 0·028–0·06 mm. chord.

From direct observation and comparison of the 32 specimens of the present collection, I have no doubt whatsoever that they are all conspecific: and since the range of variation in the dimensions of their spicules is the same, or practically the same, as that found in the five species tabulated above, especially in view of the strong resemblance these five species have to each other in all other respects, I can see no alternative to regarding them as synonymous, even though it means the admission that the oxea in this species may have the surprisingly wide range of dimensions shown, from 0·35 to 1·0 mm., and that the chelae may vary from 0·023 to 0·07 mm.

DISTRIBUTION. Wilhelm Land; Victoria Land; Graham Land; Falkland Islands.

Isodictya delicata (Thiele).

Desmacidon delicata, Thiele, 1905, p. 435, figs. 1, 55.

Occurrence. St. WS 109: Falkland Islands, 145 m.

DISTRIBUTION. Admiralty Sound.

Isodictya antarctica (Kirkpatrick) (Plate LI, fig. 4).

Desmacidon kerguelensis, var. *antarctica*, Kirkpatrick, 1908, p. 37, pl. xix, fig. 1, pl. xxiii, fig. 1.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 155: South Georgia, 260 m.; St WS 73: Falkland Islands, 121 m.; St. WS 83: Falkland Islands, 137–129 m.

DISTRIBUTION. Victoria Land.

Isodictya cactoides (Kirkpatrick).

Desmacidon kerguelensis, var. *cactoides*, Kirkpatrick, 1908, p. 38, pl. xix, fig. 2, pl. xxiii, fig. 2; *Isodictya cactoides*, Burton, 1929, p. 424.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 123: South Georgia, 230–250 m.; St. 190: Palmer Archipelago, 93–130 m.; St. MS 68: South Georgia, 220–247 m.

DISTRIBUTION. Victoria Land.

Isodictya microchela (Topsent) (Plate LI, fig. 5).

Homoeodictya microchela, Topsent, 1915, p. 37.

Occurrence. St. WS 86: Falkland Islands, 151–147 m.

REMARKS. The original description of this species is unaccompanied by any illustration, so that it can only be identified with hesitation. The present specimen appears to belong to it, but if the identification is correct then the external form of this species is that shown in Plate LI, fig. 5.

DISTRIBUTION. Burdwood Bank.

Isodictya erinacea (Topsent).

Homoeodictya erinacea, Topsent, 1916, p. 169; *H. kirkpatricki*, *id.*, *loc. cit.*, p. 169; *H. erinacea*, *id.*, 1917, p. 68, pl. iii, fig. 1, pl. vi, fig. 15; *H. kirkpatricki*, *id.*, *loc. cit.*, p. 70, pl. i, fig. 2, pl. vi, fig. 14; *Desmacidon doryphora*, Brondsted, 1926, p. 2, figs. 1, 2.

Occurrence. St. 190: Palmer Archipelago, 93–130 m.

REMARKS. In view of the strong likeness in other respects, I cannot accept the separation of *Homoeodictya kirkpatricki* and *Desmacidon doryphora* merely on account of the difference in the sizes of their respective megascleres, for that is the only character in which they differ. Under *Isodictya setifer* (see above), I have shown how much the dimensions of the spicules may vary within a single species of *Isodictya*, and the evidence from this source alone is sufficient to justify the identification of Brøndsted's species with that of Topsent. With regard to *Homoeodictya erinacea*, there is so much resemblance to the two other species that it is not possible to regard the mere presence of raphides or of tiny bosses on the chelae as characters necessitating a specific distinction.

DISTRIBUTION. Graham Land; Victoria Land.

Isodictya toxophila, sp.n. (Plate LII, figs. 2, 3; Plate LIII, figs. 1, 2; Fig. 18).

Holotype. B.M. 28. 2. 15. 158.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 148: South Georgia, 132–148 m.; St. 175: South Shetlands, 200 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 27: South Georgia, 106–109 m.

DIAGNOSIS. Sponge irregularly massive, with large oscules, or sub-infundibular with one side oscular, bearing oscules up to 2 mm. diameter, and other side poral, thrown in irregular folds; surface hispid, often verrucose; texture firm, compressible; colour, in spirit, yellow to brown; skeleton sub-isodictyal, with primary fibres 12–20 spicules thick, secondary fibres loose or represented by irregularly scattered single spicules; oxea 0·42 by 0·02 mm.; chelae 0·06 mm. chord; toxa up to 0·175 mm. long.

REMARKS. The species, which is characterized mainly by the possession of toxa in addition to isochelae, shows a similar range in external form to that found in *Haliclona bilamellata* (see p. 267). The microscleres are very variable in their occurrence, the toxa are often very rare, and in one specimen no microscleres at all could be found.

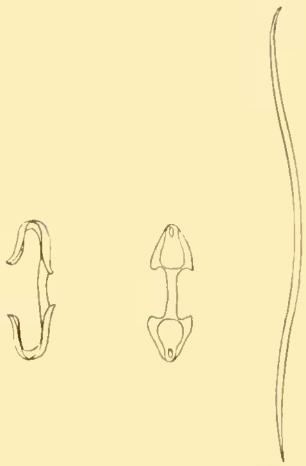

Fig. 18. *Isodictya toxophila*, sp.n. Microscleres, × 300.

Genus Guitarra, Carter

Guitarra fimbriata, Carter.

(For synonymy see Burton, 1929, p. 426.)

Occurrence. St. 39: South Georgia, 179–235 m.; St. WS 79: Falkland Islands, 131–132 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 223: Falkland Islands, 114 m.; St. WS 243: Falkland Islands, 144–141 m.

DISTRIBUTION. Arctic, Atlantic and Antarctic; Indian Ocean; New Zealand.

Genus Cercidochela, Kirkpatrick

Cercidochela lankesteri, Kirkpatrick.

C. lankesteri, Kirkpatrick, 1907, p. 284; *id.*, 1908, p. 42, pl. xix, fig. 5, pl. xxiii, fig. 5; Hentschel, 1914, p. 74; Burton, 1929, p. 426, pl. v, fig. 8.

Occurrence. St. 187: Palmer Archipelago, 259 m.

DISTRIBUTION. Victoria Land; Wilhelm Land.

Genus Plumocolumella, Burton

Plumocolumella maeandrina (Kirkpatrick).

Desmacidon maeandrina, Kirkpatrick, 1907, p. 282; *id.*, 1908, p. 40, pl. xix, fig. 4, pl. xxiii, fig. 4; *Plumocolumella maeandrina*, Burton, 1929, p. 425.

Occurrence. St. 27: South Georgia, 110 m.; St. 42: South Georgia, 120–204 m.; St. 123: South Georgia, 160 m.; St. 148: South Georgia, 132–148 m.; St. 149: South Georgia, 200–234 m.; St. 158: South Georgia, 401–411 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 33: South Georgia, 130 m.

DISTRIBUTION. Victoria Land.

Plumocolumella myxillioides, sp.n. (Plate LIII, figs. 3, 4).

Holotype. B.M. 28. 2. 15. 321.

Occurrence. St. WS 79: Falkland Islands, 131–132 m.; St. WS 80: Falkland Islands, 152–156 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 248: Falkland Islands, 210–242 m.

DIAGNOSIS. Sponge erect, arborescent with flattened anastomosing branches or sublamellate; surface smooth and even, bearing a conspicuous veining due to large subdermal canals showing through a transparent dermis; numerous circular depressions, scattered singly or in groups generally over surface, which probably bear both inhalant and exhalant apertures; colour, in spirit, yellow; skeleton, composed of irregular wisp-like bundles of tornota running longitudinally through branches, often forming a dense axial core, and bending towards surface or send off lateral branches to end in dermal brushes; tornota of main skeleton usually straight and smooth, with ends evenly and gradually pointed, frequently hastate or mucronate, measuring 0·3 by 0·006 mm.; isochelae arcuatae (?), 0·03 mm. chord.

Section *MYCALEAE*

Genus Mycale, Gray

Mycale magellanica (Ridley).

Esperia magellanica, Ridley, 1881, p. 117, pl. x, fig. 5; *E. cunninghami*, Carter, 1882, p. 300, pl. xi, fig. 17; *Esperella magellanica*, Ridley and Dendy, 1887, p. 67; *Mycale magellanica*, Thiele, 1905, p. 442; *Mycale* sp., *id.*, *loc. cit.*, p. 443, fig. 61: *Mycale* sp., Kirkpatrick, 1908, p. 37; *M. magellanica*, Topsent, 1913, p. 632, pl. iv, fig. 4, pl. vi, fig. 10; *M. pellita*, *id.*, *loc. cit.*, p. 633, pl. v, fig. 2; *M. antarctica*, Hentschel, 1914, p. 58, pl. v, fig. 7; *M. rossi*, *id.*, *loc. cit.*, p. 59, pl. v, fig. 8; *M. magellanica*, Dendy, 1924, p. 336; *M. lillei*, *id.*, *loc. cit.*, p. 337.

Occurrence. St. 53: Falkland Islands, 0–2 m.; St. 55: Falkland Islands, 10–16 m.; St. 146: South Georgia, 728 m.; St. 175: South Shetlands, 200 m.; St. WS 73: Falkland Islands, 121 m.; St. WS 82: Falkland Islands, 140–144 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 87: Falkland Islands, 96–127 m.; St. WS 90: Tierra del Fuego, 82–81 m.; St. WS 177: South Georgia, 97 m.; St. WS 210: Falkland Islands, 161 m.; St. WS 213: Falkland Islands, 249–239 m.; St. WS 222: Falkland Islands, 100–106 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 233, Falkland Islands, 185–175 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 244: Falkland Islands, 253–247 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 247: Falkland Islands, 172 m.; St. WS 248: Falkland Islands, 210–242 m.; St. WS 249: Falkland Islands, 166 m.; St. WS 250: Falkland Islands, 251–313 m.

REMARKS. The synonymy of *M. magellanica* will be dealt with fully in a report, to be published shortly, on the collections of the Swedish Antarctic Expedition. One point only need be noted here in connection with this species, that a single specimen from St. WS 222, otherwise typical, is entirely without microscleres.

DISTRIBUTION. Southern extremity of South America; Graham Land; Victoria Land; Wilhelm Land.

Mycale lapidiformis (Ridley and Dendy).

Esperella lapidiformis, Ridley and Dendy, 1886, p. 338; *id.*, 1887, p. 64, pl. xv, figs. 2, 10, pl. xvi, fig. 2.

Occurrence. St. WS 248: Falkland Islands, 210–242 m.

DISTRIBUTION. Mouth of Rio de la Plata.

Mycale acerata, Kirkpatrick.

M. acerata, Kirkpatrick, 1907, p. 280; *id.*, 1908, p. 36, pl. xx, fig. 1, pl. xxiv, fig. 10; *M. acerata*, var. *minor*, Hentschel, 1914, p. 63; *M. acerata*, Topsent, 1917, p. 63; Burton, 1929, p. 430.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 45: South Georgia, 238–270 m.; St. 159: South Georgia, 160 m.; St. 164: South Orkneys, 24–36 m.; St. 175: South Shetlands, 200 m.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Mycale tridens, Hentschel.

M. tridens, Hentschel, 1914, p. 56, pl. v, fig. 6; Topsent, 1917, p. 63; Burton, 1929, p. 430.

Occurrence. St. 170: Clarence Island, 342 m.; St. MS 71: East Cumberland Bay, South Georgia, 110–60 m.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Mycale macrochela, sp.n. (Plate LI, fig. 6).

Holotype. B.M. 28. 2. 15. 827.

Occurrence. St. 170: Clarence Island, 342 m.

DIAGNOSIS. Sponge lamellar with large oscules, up to 8 mm. in diameter and with conspicuous membranous collar, scattered over one surface; surface even, minutely hispid; texture firm, friable; colour, in spirit, dark greenish grey; skeleton a loose reticulation of bundles of subtylostyli, with brushes of subtylostyli at surface; subtylostyli 0·53 by 0·017 mm.; anisochelae 0·07, 0·035 and 0·022 mm. chord; sigmata 0·1 mm. chord; trichodragmata 0·035 mm. long.

REMARKS. The species is remarkable for its plate-like external form and for the form of the anisochelae. It resembles *M. simonis*, from South Africa, most closely in the form of the anisochelae, but differs considerably from this species in all other respects.

Genus **Amphilectus**, Vosmaer

Amphilectus fucorum (Esper) (Plate LIV, figs. 1–4).

Spongia fucorum, Esper, 1794, p. 278, pl. xlix, figs. 1, 2; *S. parasitica*, Montagu, 1818, p. 114; Gray, 1821, p. 360; Grant, 1826, p. 348; *Halichondria parasitica*, Flemming, 1828, p. 521; *Halispongia parasitica*, Blainville, 1834, p. 532; *Halichondria parasitica*, Bellamy, 1839, p. 268; Thompson, 1840, p. 254; *H. fucorum*, Johnston, 1842, p. 112, pl. ix, pl. xii, fig. 2; *Isodictya normani*, Bowerbank, 1866, p. 320; *I. fucorum*, *id.*, *loc. cit.*, p. 322; *I. alderi*, *id.*, *loc. cit.*, p. 323; *I. edwardii*, *id.*, *loc. cit.*, p. 325; *I. paupera*, *id.*, *loc. cit.*, p. 328; *I. uniformis*, *id.*, *loc. cit.*, p. 329; *I. clarkei*, *id.*, *loc. cit.*, p. 330; *I. gracilis*, *id.*, *loc. cit.*, p. 331; *I. normani*, Gray, 1867, p. 534;

I. paupera, Parfitt, 1868, p. 8; *I. uniformis*, Bowerbank, 1874, p. 139, pl. lv, figs. 8–10; *I. normani*, *id.*, *loc. cit.*, p. 141, pl. lvi, figs. 1–5; *I. clarkei*, *id.*, *loc. cit.*, p. 142, pl. lvi, figs. 11–15; *I. fucorum*, *id.*, *loc. cit.*, p. 142, pl. lvi, figs. 16–19; *I. alderi*, *id.*, *loc. cit.*, p. 143, pl. lvi, figs. 20–26; *I. edwardii*, *id.*, *loc. cit.*, p. 148, pl. lviii, figs. 15–18; *I. gracilis*, *id.*, *loc. cit.*, p. 149, pl. lviii, figs. 23–26; *I. imitata*, *id.*, *loc. cit.*, p. 223, pl. lxxvi, figs. 3–6; *I. invalida*, *id.*, *loc. cit.*, p. 285, pl. lxxxv, figs. 8–10; *I. dubia*, *id.*, *loc. cit.*, p. 323, pl. xc, figs. 4–7; *Hymeniacidon callosus*, Bowerbank, 1882, p. 86, pl. iv, figs. 6–8; *Amphilectus gracilis*, Vosmaer, 1880, p. 111; *A. compressus*, *id.*, *loc. cit.*, p. 112; *A. dubius*, *id.*, *loc. cit.*, p. 112; *A. imitatus*, *id.*, *loc. cit.*, p. 116; *A. fucorum*, *id.*, *loc. cit.*, p. 117; *A. normani*, *id.*, *loc. cit.*, p. 117; *A. clarkei*, *id.*, *loc. cit.*, p. 119; *Isodictya gracilis*, Bowerbank, 1882, p. 136; *I. invalida*, *id.*, *loc. cit.*, p. 136; *I. normani*, *id.*, *loc. cit.*, p. 136; *I. hispida*, *id.*, *loc. cit.*, p. 136, pl. xii, figs. 1–5; *I. alderi*, *id.*, *loc. cit.*, p. 138; *I. edwardii*, *id.*, *loc. cit.*, p. 138; *I. fucorum*, *id.*, *loc. cit.*, p. 138; *I. clarkei*, *id.*, *loc. cit.*, p. 139; *I. paupera*, *id.*, *loc. cit.*, p. 139; *I. uniformis*, *id.*, *loc. cit.*, p. 139; *I. dubia*, *id.*, *loc. cit.*, p. 140; *I. imitata*, *id.*, *loc. cit.*, p. 141; *I. involuta*, *id.*, *loc. cit.*, p. 143, pl. x, figs. 1–4; *I. pertenuis*, *id.*, *loc. cit.*, p. 144, pl. xiii, figs. 1–4; *I. scitula*, *id.*, *loc. cit.*, p. 146, pl. iv, figs. 1–3, pl. ix, figs. 1–3; *Esperia normani*, Fristedt, 1885, p. 42; *Reniera fucorum*, Topsent, 1888, p. 148; *R. paupera*, *id.*, *loc. cit.*, p. 148; *R. uniformis*, *id.*, *loc. cit.*, p. 149; *Stylinos uniformis*, *id.*, 1891, p. 535; *Esperiopsis normani*, Lundbeck, 1905, p. 13, pl. viii, fig. 2; *Esperiopsis* sp., *id.*, *loc. cit.*, p. 15, pl. viii, fig. 3; *E. edwardii*, Thiele, 1905, p. 441; *E. fucorum*, Stephens, 1912, p. 36; *E. edwardii*, Hentschel, 1914, p. 69; *E. informis*, Stephens, 1915, p. 450, pl. xi, fig. 11; *E. fucorum*, Stephens, 1921, p. 17; *E. normani*, Brondsted, 1923, p. 138, fig. 18; *E. crasso-fibrosa*, *id.*, *loc. cit.*, p. 139, fig. 19; *E. edwardii*, Dendy, 1924, p. 341; *E. normani*, Brondsted, 1926, p. 5; *Amphilectus gracilis*, Burton, 1929, p. 428; *Axinosia incrustans*, Burton, 1930, p. 333, fig. 1.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.; St. 42: South Georgia, 120–204 m.; St. 51: Falkland Islands, 105–115 m.; St. 160: Shag Rocks, 177 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 229: Falkland Islands, 210–271 m.

DIAGNOSIS. Sponge polymorphic, encrusting, massive, or branching; surface even, minutely hispid; oscules inconspicuous in encrusting forms, small and scattered or large and crateriform in massive forms, small, often arranged in linear series in branching forms; skeleton isodictyal to sub-isodictyal; no special dermal skeleton; megascleres smooth, usually curved styli, 0·135–0·48 by 0·003–0·019 mm.; microscleres palmate isochelae, 0·014–0·028 mm.

REMARKS. Bowerbank, in his *Monograph of the British Spongiadae* (1866–82), described twelve species of *Isodictya* possessing styli and palmate anisochelae. All agree so very closely in spiculation that, judging from this aspect alone, there would be no hesitation in regarding them all as synonyms of a single species. Certain differences in their external appearance give rise, however, to a little hesitation in taking so drastic a step, and it is necessary to compare them from this point of view.

I. normani is massive with large, crater-like oscules, or encrusting with small, scattered oscules; colour (alive) unknown, (dried) fawn-yellow.

I. fucorum is massive with comparatively large, scattered oscules; colour (alive) "bright red or pink, to pale ash or brown".

I. alderi is encrusting, with inconspicuous oscules; colour (alive) faint red.

I. edwardii is encrusting, with inconspicuous oscules; colour (dried) "ochreous yellow".

I. paupera is encrusting, with inconspicuous oscules; colour (dried) "light ochreous yellow".

I. gracilis is ramose and branching, with small oscules; colour (alive) pale buff, (dried) cream white.

I. imitata is encrusting, with no visible oscules; colour (dried) "brown with tint of green".

I. dubia is encrusting, with no conspicuous oscules; colour (dried) "light grey with tint of yellow", (alive) orange.

I. hispida is encrusting, with no visible oscules; colour (dried) dark grey.

I. nodosa is massive, with fistulous oscules; colour (dried) light brown.

I. involuta is encrusting, with no apparent oscules; colour (dried) dark brown.

I. scitula is encrusting, with no apparent oscules; colour (dried) "light ochreous yellow".

With the exception of *I. gracilis*, there is nothing in the shape of these sponges to justify a segregation into different species. The colour records taken from the dried state may be ignored. In my experience, the result of drying, so far as colour is concerned, depends more on the manner in which the sponge is dried, than on the colour in the living condition. The records taken from living specimens show considerable variation in colour, but with a tendency to a reddish tint.

If any division is to be made it must take the form of separating the twelve species into two forms of a single species, a branching form, including *I. gracilis*, and a massive form including all the rest. Even so, it is probable that the two forms are purely ecological and that in the course of future investigations, all gradations between the two may be found.

The dimensions of the spicules of *Amphilectus fucorum*, as exemplified by the holotypes of the twelve species of *Isodictya* enumerated by Bowerbank, are: oxea 0·135–0·2 by 0·003–0·008 mm., and isochelae 0·014–0·018 mm.

Gray (*loc. cit.*), Vosmaer (*loc. cit.*) and Topsent (*loc. cit.*) add nothing new to our knowledge of these forms. Ridley (1883) described two specimens from Scotland, under *Amphilectus edwardii*, one of which was erect and branching and the other cylindrical. At the same time, he doubts the identity of *Isodictya gracilis* with *I. edwardii*, although his own specimens had the external form of the former. On the other hand, Levinsen (*loc. cit.*), Lundbeck (*loc. cit.*) and Stephens (1921) leave no doubt that *Esperiopsis fucorum* may be either encrusting or branched. Further, I have seen massive specimens from Plymouth, with large oscules, in which the surfaces were beset with numerous blunt processes, up to 2 cm. long, undoubtedly representing incipient branches. We may now assume, I think, that there is nothing peculiar about *Isodictya gracilis* and that it is a synonym of *Amphilectus fucorum*.

Numerous specimens of *Amphilectus fucorum* have been recorded, under various names, from the southern hemisphere which agree in external form with those of the northern hemisphere. They have this in common, however, that the styli are considerably larger in the southern forms and the chelae slightly so. The recorded measurements of the spicules are: Thiele (Falkland Islands), styli 0·225–0·26 by 0·01 mm., chelae 0·022 mm.; Hentschel (Kerguelen), styli 0·185–0·276 mm., chelae 0·019–0·022 mm.; Brøndsted (New Zealand), styli 0·2–0·29 by 0·007–0·008 mm., chelae 0·025 mm.; Dendy (New Zealand), styli 0·3 by 0·012 mm., chelae 0·028 mm. From this it is clear that Stephens' *Esperiopsis informis* is also a synonym of *Amphilectus fucorum*. In addition to those already referred to, I have found several small fragments of the same species among the Terra Nova collections which came to my notice too late to be included in my report on those collections. The distribution is thus extended to the Antarctic.

Of the eight specimens in the present collection, three are typical in form, the first (Plate LIV, fig. 4) being encrusting, the others (Plate LIV, figs. 1–3) massive with incipient branching processes. Of the remaining five, one is small and massive, the rest are large and massive, quite unlike anything hitherto recorded for the species. At the same time, the structure of the skeleton in all the specimens is the same, and is identical with that of the European forms of *A. fucorum*, and the size of the spicules very similar. The latter is in some cases greater than any hitherto recorded for the species. The dimensions are: styli 0·27–0·48 by 0·009–0·019 mm., the chelae 0·021–0·028 mm., the figures representing the range of average spicule size for the eight specimens.

There has been a tendency in the past to confuse *Esperiopsis edwardii*, var. *americana*, with the present species. I take the opportunity therefore to include a photograph of the typical form of the variety (Plate LIV, fig. 5). In all probability, *E. rugosa* and its var. *major* are synonyms of this form, which I propose to regard as a separate species, *Amphilectus americanus* (Ridley and Dendy), distinguished by its external form.

Distribution. Europe; South Africa; Falklands; New Zealand; Antarctic.

Amphilectus rugosus (Thiele).

Esperiopsis rugosa, Thiele, 1905, p. 440, fig. 50; *E. rugosa*, var. *major*, Hentschel, 1914, p. 68; *Amphilectus rugosa*, var. *major*, Burton, 1929, p. 430.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.; St. WS 85: Falkland Islands, 79 m.

Distribution. Calbuco, Chile; Victoria and Wilhelm Lands, Antarctic.

Amphilectus flabellata, sp.n. (Plate LIII, fig. 5).

Holotype. B.M. 28. 2. 15. 409.

Occurrence. St. WS 88: Falkland Islands, 96–127 m.

Diagnosis. Sponge massively flabellate, erect; surface uneven, minutely conulose, hispid; oscules and pores not apparent; colour, in spirit, dark brown; skeleton a sub-isodictyal, usually triangular and unispicular, reticulation with occasional multispicular bands running irregularly through sponge; no special dermal skeleton; little or no spongin; megascleres smooth styli, usually slightly curved, 0·285 by 0·009 mm.; microscleres palmate isochelae of usual type, 0·015–0·024 mm. long.

Remarks. The holotype resembles *Esperiopsis fucorum*, and other allied species, in the structure of the skeleton and in the size and shape of the spicules. It differs from them all in external form. The specimen is massively flabellate, 12 cm. high, 14 cm. across and 2 cm. thick.

Genus Biemna, Gray

Biemna chilensis, Thiele.

B. chilensis, Thiele, 1905, p. 434, fig. 54; *B. macrorhaphis*, Hentschel, 1914, p. 74, pl. vi, fig. 3.

Occurrence. St. 177: South Shetlands, 1080 m.; St. 187: Palmer Archipelago, 259 m.; St. WS 243: Falkland Islands, 144–141 m.

DISTRIBUTION. Calbuco, Chile; Wilhelm Land.

Genus Asbestopluma, Norman

Asbestopluma calyx, Hentschel.

A. calyx, Hentschel, 1914, p. 66, pl. iv, fig. 4, pl. v, fig. 11.

Occurrence. St. 156: South Georgia, 200–236 m.

DISTRIBUTION. Wilhelm Land.

Genus Arenochalina, Lendenfeld

The genus, established by Lendenfeld (1887, p. 821) for a single species *A. mirabilis*, possesses very slender subtylostyli, not oxea as originally stated, and according to Hallmann (1912, p. 252 footnote), possibly anisochelae. There are several specimens in the British Museum collection, identified by Lendenfeld, which if not actual type specimens are sufficiently representative of the species to serve in their stead. From these it is obvious that the species is a degenerate *Mycale*.

The second species which I propose to assign to the genus differs from the type species in the structure of the skeleton, but agrees in the shape of its megascleres. The two may possibly be unrelated, but they are sufficiently alike in some features to make it convenient to include them provisionally in the same genus, and the diagnosis is emended accordingly.

DIAGNOSIS. Reduced Mycaleae with main skeleton composed of very slender subtylostyli, having enlarged axial canals; skeleton either a sub-isodictyal network of spongin fibres cored by spicules, or composed of loose wisps of spicules running vertically to surface and branching and anastomosing *en route*; special dermal skeleton absent; microscleres, when present, palmate anisochelae, toxa or both.

Arenochalina incrustans, sp.n. (Fig. 19).

Holotype. B.M. 28. 2. 15. 360.

Occurrence. St. 2: Ascension Island, attached to buoy.

DIAGNOSIS. Sponge encrusting; surface smooth, slightly conulose; oscules and pores not visible; colour, in spirit, white; skeleton composed of wisps of spicules running more or less vertically to surface, branching and anastomosing as they go; outermost ends of wisps ending just below ectosome; little or no spongin; megascleres subtylostyli, occasionally almost stylote, 0·165 by 0·003 mm.; microscleres blunt-ended toxa, 0·07 by 0·002 mm.

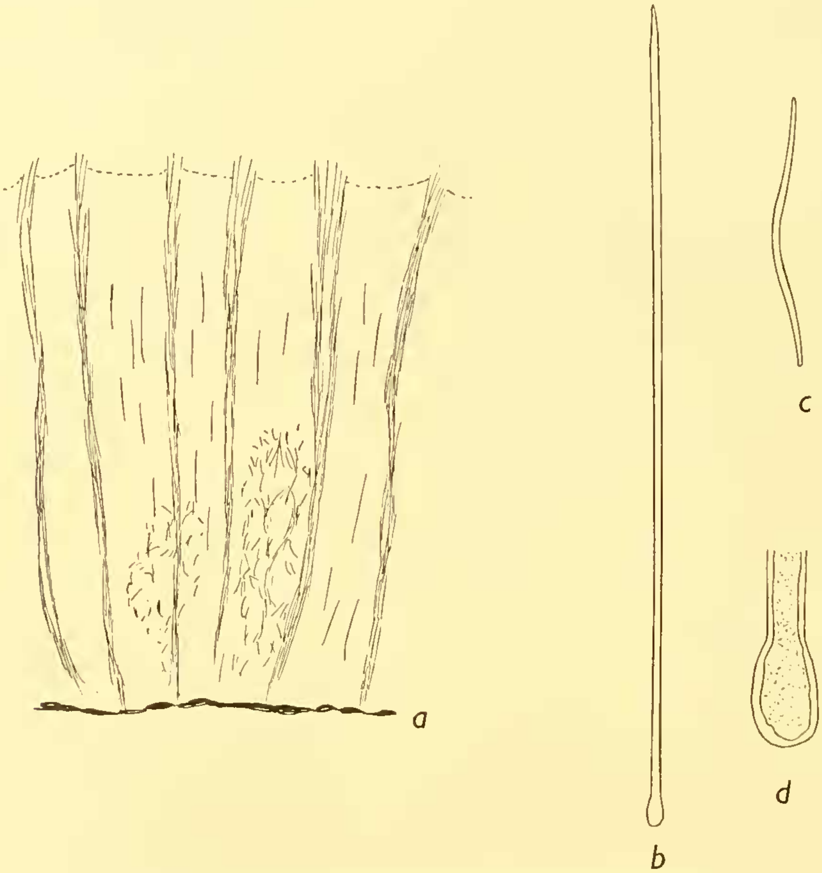

Fig. 19. *Arenochalina incrustans*, sp.n. *a*, section at right angles to surface, showing "nests" of toxa at centre, × 36; *b*, subtylostyle, × 500; *c*, toxon, × 500; *d*, base of subtylostyle, very much enlarged, to show relative size of axial canal.

REMARKS. The species is evidently a degenerate *Mycale* but whether it represents a species in which the spiculation has become permanently degenerate, or whether it is an individual, with skeleton pathologically affected, of a species with more normal spiculation, it is impossible to say. At all events, the major part of a megasclere consists of the axial canal (Fig. 19 *d*).

The toxa are not distributed evenly throughout the tissues, as is usual, but are found in "nests" (Fig. 19 *a*).

Genus Acanthorhabdus, Burton

Acanthorhabdus fragilis, Burton.

A. fragilis, Burton, 1929, p. 432, pl. iv, fig. 2, text-fig. 5.

Occurrence. St. 170: Clarence Island, 342 m.

DISTRIBUTION. Victoria Land.

Genus Sigmotylotella, gen.n.

Genotype. S. suberitoides, sp.n.

DIAGNOSIS. Mycaleae with main skeleton a confused reticulation of large tylostyli and dermal skeleton a palisade of small tylostyli set more or less at right angles to surface; microscleres sigmata.

REMARKS. The structure of the skeleton in *Sigmotylotella* resembles that of *Suberites* very closely, but the shape of the tylostyli and the presence of the sigmata definitely show it to be a member of the Mycaleae. It seems to be most nearly related to *Tylodesma*.

Sigmotylotella suberitoides, sp.n. (Fig. 20).

Holotype. B.M. 28. 2. 15. 400.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DIAGNOSIS. Sponge encrusting; surface sparsely papillate, markedly hispid; oscules situated at apices of papillae; pores apparently distributed generally over surface; interior cavernous; texture firm but friable; colour, in spirit, black; main skeleton a confused reticulation of tylostyli of varying size arranged singly or in loose bundles; dermal

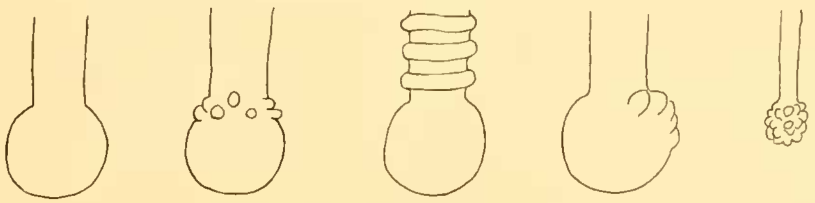

Fig. 20. *Sigmotylotella suberitoides*, sp.n. Tylostyli: *a*, normal; *b*, *d*, with tuberculate base; *c*, with annulate shaft; *e*, developmental form.

skeleton a dense palisade of small tylostyli directed more or less at right angles to surface; tylostyli of main skeleton with curved shaft and well-developed spherical head, 1·0 by 0·018 mm.; tylostyli of dermal skeleton similar in shape to those of main skeleton, 0·6 by 0·012 mm.; microscleres simple contort sigmata, 0·028 mm. chord.

REMARKS. A curious feature of the spicules is that, very often, the bases of the tylostyli are tuberculate. This is more marked in the tylostyli of the dermal layer. Further, it is significant that the bases of developing spicules are also tuberculate (Fig. 20 *e*). Occasionally, a shaft may bear annular thickenings, and it is not improbable that this abnormality may be comparable with the tuberculations on the bases.

Section *IOPHONEAE*

Genus Iophon, Gray

Alebion, Gray, 1867, p. 534 (*nec* Kröyer): preoccupied; *Iophon*, Gray, 1867, p. 534 (genotype: *Halichondria scandens*, Bowerbank); *Pocillon*, Topsent, 1891, p. 539 (genotype: *Halichondria hyndmani*, Bowerbank); *Iophonopsis*, Dendy, 1924, p. 348 (genotype: *Halichondria nigricans*, Bowerbank); *Burtonella*, de Laubenfels, 1928, p. 361 (genotype: *Burtonella melanokhemia*, de Laubenfels).

REMARKS. The many attempts to establish a clear understanding of those species of *Halichondria*, described by Bowerbank, in which the spiculation consists of acanthostyli, tornota, anisochelae and bipocilla, have led to much confusion and a multiplication of generic names. Gray (*loc. cit.*) divided them between two genera, the first of which, *Alebion*, for *Halichondria hyndmani*, Bowerbank, was preoccupied (*Alebion*, Kröyer, 1863, Crustacea, *fide* Marschall, *Nomeclator Zoologicus*, 1873). The second, *Iophon*, for *Halichondria scandens*, Bowerbank, is here retained. Later, Topsent (*loc. cit.*) established the genus *Pocillon* for *Halichondria hyndmani*, which, as Dendy (*loc. cit.*) pointed out, is probably a synonym of *H. scandens*. *Pocillon* becomes therefore a synonym of *Iophon*. At the same time, Dendy proposed to divide the species of *Iophon* into two groups, retaining the name *Iophon* for the first and proposing the name *Iophonopsis* for those species without echinating acanthostyli. My own investigations have shown that some species are devoid of echinating acanthostyli during the early part of their life, but possess them later, and that in those species in which they normally occur these spicules may be only sparingly present or even absent from large tracts of the sponge. As the presence or absence of echinating acanthostyli are the only features by which a distinction between *Iophon* and *Iophonopsis* can be maintained, the use of the latter name must be abandoned. Such a variable character obviously cannot be used for purposes of generic distinction (cf. *Iophon chelifer*). And finally, *Burtonella* is a synonym of *Iophonopsis* and is here included in the list of synonyms of *Iophon*.

Iophon radiatus, Topsent.

(For synonymy see Burton, 1929, p. 442, and 1931, pp. 512–518.)

Occurrence. St. 123: South Georgia, 230–250 m.; St. 145: South Georgia, 26–35 m.; St. 170: Clarence Islands, 342 m.; St. 175: South Shetlands, 200 m.; St. 179: Palmer Archipelago, 4–10 m.; St. WS 33: South Georgia, 130 m.; St. WS 83: Falkland Islands, 137–129 m.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Iophon proximum (Ridley) (Plate LVII, figs. 1–13; Figs. 21–24).

Alebion proximum, Ridley, 1881, p. 119, pl. x, fig. 8; *Iophon chelifer*, Ridley and Dendy, 1886, p. 349; *I. pattersoni*, *id.*, 1887, p. 117; *I. chelifer*, *id.*, *loc. cit.*, p. 119, pl. xvi, fig. 3, pl. xvii, figs. 1, 3, 8; *I. chelifer*, Lambe, 1893, p. 30, pl. ii, fig. 7; *id.*, 1896, p. 191; *id.*, 1900, p. 23; *I. chelifer ostia-magna*, Wilson, 1904, p. 143, pl. xx, figs. 2, 4, 10, 11, pl. xxiv, fig. 1; *I. lamella*, *id.*, *loc. cit.*, p. 146, pl. xx, figs. 3, 7–9, 12, 13, pl. xxiv, figs. 2–4; *I. lamella indivisus*, *id.*, *loc. cit.*, p. 149, pl. xx, figs. 14–16; *I. chelifer*, Thiele, 1905, p. 445, fig. 63; *I. proximus* (*sic*) *reticularis*, Hentschel, 1914, p. 39.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.; St. 39: South Georgia, 179–235 m.; St. 42: South Georgia, 120–204 m.; St. 51: Falkland Islands, 105–115 m.; St. 157: South Georgia, 970 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 85: Falkland Islands, 79 m.; St. WS 128: Gough Island, 120–90 m.; St. WS 247: Falkland Islands, 172 m.

REMARKS. The Challenger specimens of *I. chelifer* exhibit a variability in spiculation totally unsuspected from the description given by Ridley and Dendy. The lectotype, *Iophon proximum* (Ridley): *Table showing known specimens in order of size, with details of external form and spiculation.*

Specimen	Shape	Size	Measurements of spicules in μ				
			Main acanthostyli	Echinating acanthostyli	Tornota	Anisochelae	Bipocilla
Alebion proximum, Ridley (type)	Encrusting	Less than 1 mm. thick	160 × 8	84 (abundant)	140 × 7	?–25 (very rare)	10 (extremely rare)
Iophon indentatus, Wilson (type)	Encrusting	0·5–1 mm. thick	220 × 15	Not recorded	220 × 8	14 (abundant)	8 (abundant)
*D 431**, St. 6	Encrusting	5 mm. thick	190 × 9	100 (rare)	210 × 4	9–28 (common)	14 (extremely rare)
Iophon proximus reticularis, Hentschel (type)	Encrusting	?	140 × 8	105 (rare)	175 × 5	18–24 (common)	Absent
D 740, St. WS 85	Massive	Fragmentary	190 × 14	105 (common)	190 × 6	17–23 (extremely abundant)	9 (common)
D 254, St. 51	Massive, with plicate surface	20 × 5 × 5 mm.	185 × 10	105 (uncommon)	200 × 7	?–32 (very rare)	11 (very rare)
D 252, St. 51	Irregularly massive	30 × 20 × 20 mm.	185 × 10	105 (common)	200 × 7	?–35 (very rare)	11 (rare)
D 430, St. WS 128	Massive with numerous foreign bodies incorporated	Fragmentary	200 × 8	100 (rare)	190 × 6	?–20 (very rare)	11 (rare)
D 256, St. 6	Massive	40 × 15 × 15 mm.	210 × 7	105 (occasional)	210 × 4	14–25 (very rare)	14 (common)
D 739, St. WS 247	Irregularly massive	30 × 30 × 10 mm.	200 × 14	105 (abundant)	175 × 6	14–28 (abundant)	11 (abundant)
D 251, St. 83	Massive	50 × 30 × 20 mm.	200 × 14	122 (common)	210 × 7	20–35 (common)	11 (common)
Iophon chelifer, Ridley and Dendy (lectotype)	Massive	Fragmentary	215 × 18	140	240 × 7	18–32 (abundant)	18 (abundant)
Iophon chelifer, Ridley and Dendy (cotype), B.M. 87. 5. 2. 158	Massive	?	370 × 14	Not seen	290 × 7	14–? (rare)	18 (abundant)
Iophon chelifer, Ridley and Dendy (cotype), B.M. 87. 5. 2. 157	Massive	Fragmentary	370 × 21	105 (rare)	300 × 9	14–32 (abundant)	12 (very common)
Iophon chelifer (Lambe's specimen)	Massive, subclathrate	80 × 50 mm.	300 × 16	Not recorded	250 × 7	29–36	13–18
Iophon pattersoni (Bowerbank), Challenger, St. 308	Massive	Fragmentary	210 × 14	105 (common)	210 × 6	?–28 (extremely rare)	7 (extremely abundant)
Iophon pattersoni (Bowerbank), Challenger, St. 311	Massive	Fragmentary	250 × 8	140 (rare)	210 × 4	14–38 (uncommon)	9 (abundant)
Iophon chelifer (Thiele's specimen)	Massive with digitate or tubular processes	80 mm. high	250 × 15	Not recorded	210 × 7	16–28	15
D 253, St. 51	Massive	30 × 30 × 25 mm.	185 × 12	105 (rare)	205 × 7	14–32 (common)	Not seen
D 258, St. 51	Flabellate	50 × 50 × 10 mm.	185 × 10	100 (rare)	200 × 4	17–32 (uncommon)	11 (common)
D 255, St. WS 83	Low-growing and massive or flabellate (?)	60 × 30 × 15 mm.	210 × 14	105 (common)	240 × 7	11–21 (rare)	11 (common)
Iophon lamella indivisus, Wilson (type)	Massive, spreading	40 × 40 mm.	210 × 14	Not recorded	230 × 7	12–28	8–10
Iophon chelifer ostia-magna, Wilson (type)	Massive, spreading	50 × 40 mm.	440 × 10	Not recorded	315 × 8	12–20	16–20
Iophon lamella, Wilson (type)	Massive, spreading	60 × 40 m.	210 × 14	Not recorded	230 × 7	14–28	12–16
G 109†	Massive to flabellate	Fragmentary	350 × 14	70 (very rare)	290 × 7	14–32 (common)	14 (common)
D 837, St. WS 83	Massive with plicate surface	70 × 30 × 40 mm.	185 × 12	Not seen	205 × 7	14–32 (common)	12 (common)
D 257, St. 51	Flabellate	Fragmentary: probably 100 × 100 × 30 mm. when complete	185 × 12	Not seen	205 × 7	14–32 (uncommon)	11 (uncommon)

* *D* = Discovery specimen: to complete the registered number entered in the British Museum catalogue, the number given here must be preceded by 28. 2. 15.
† *G* = Gilchrist's specimen: complete number = 04. 12. 1. 109.

B.M. 87. 5. 2. 116, takes the form of a number of dark brown fragments of a low-growing sponge with the surface thrown into numerous folds, resembling the adult form of *I. pattersoni*. The main acanthostyli have the same form as those of the juvenile stages of the same species (Fig. 23 *c*), while the echinating acanthostyli have much the same form as those of the adult forms (Fig. 21). The tornota are truncate at the ends where they are beset with a few spines (Fig. 22 *c*). Chelae are rare, but the characteristic trifoliate, occasionally bifoliate, bipocilla are present in abundance (Fig. 24 *c*). The second specimen, B.M. 87. 5. 2. 158, from Prince Edward Island, of which nothing remains except a microscopic preparation, has the same skeleton as the foregoing except that the anisochelae are more numerous and the acanthostyli slightly longer. The next specimen, B.M. 87. 5. 2. 157, the "young specimen" from the Cape of Good Hope (*fide* Ridley and Dendy 1887, p. 120), is an extremely thin crust growing on a piece of coral. In this the main acanthostyli are slightly longer than in the lectotype and are strongly spined throughout their length, more particularly at the base and at a point just below the apex (Fig. 23 *b*). Echinating acanthostyli are present and the tornota have an oval head at each end beset with numerous spines (Fig. 22 *b*). The latter, in addition to being scattered among the meshes of the main skeleton, also form a tangential skeleton in the dermis, where they are thickly packed but not arranged in a definite reticulation. Anisochelae, measuring 0·012–0·021 mm. long, are present, the larger being arranged in rosettes. The bipocilla bifoliate, but occasionally trifoliate with the smaller end multi-dentate, are sparingly present (Fig. 24 *b*).

Fig. 21. *Iophon proximum* (Ridley): a typical echinating acanthostyle, × 400.

Lambe's (1893) specimens from Vancouver appear to be almost identical with the lectotype, while Thiele's (*loc. cit.*) differ apparently only in the smaller size of the acanthostyli. In both cases, however, no echinating acanthostyli were recorded. *I. chelifer ostia-magna*, Wilson, from the Galapagos Islands, differs in the larger size of the acanthostyli and tornota. Again no echinating acanthostyli are recorded. The external form, moreover, is lamellar. The same external form is found in a group of specimens presented to the British Museum by the late Dr Gilchrist, B.M. 04. 12. 1. 109, from the Natal coast, some of which are massive with low lamellate outgrowths and some purely lamellate.

Among the Discovery sponges are a number which approximate to the type of *I. chelifer* and must be considered in relation to it. In fact, despite obvious differences, it can be shown that they are actually conspecific with it and that these differences are merely fluctuating variations, perhaps ecological in origin.

These specimens vary from encrusting to irregularly massive, massive and spreading, sub-clathrate or flabellate (and erect). The surface in the massive specimens may be smooth, ridged, meandrine, plicate or bearing small flabellate processes. The colour is always dark brown and the texture friable. The skeleton is a sub-isodictyal reticulation of acanthostyli, echinated at the nodes by smaller acanthostyli, and the dermis is supported by a tangential layer of tornota. Anisochelae and bipocilla are present.

In all respects, these specimens appear to be conspecific, despite obvious differences in the shape and size of the acanthostyli and tornota and in the shape of the bipocilla; and this is even more clearly shown when they are compared with the specimens recorded under the various names included above as synonyms of *I. chelifer*. Nevertheless, it must be confessed that the species is an unusually variable one. The variation in external form is not particularly marked, but in the spicules it is, although the series of transitions which it is possible to construct leave no doubt as to the identity of all the

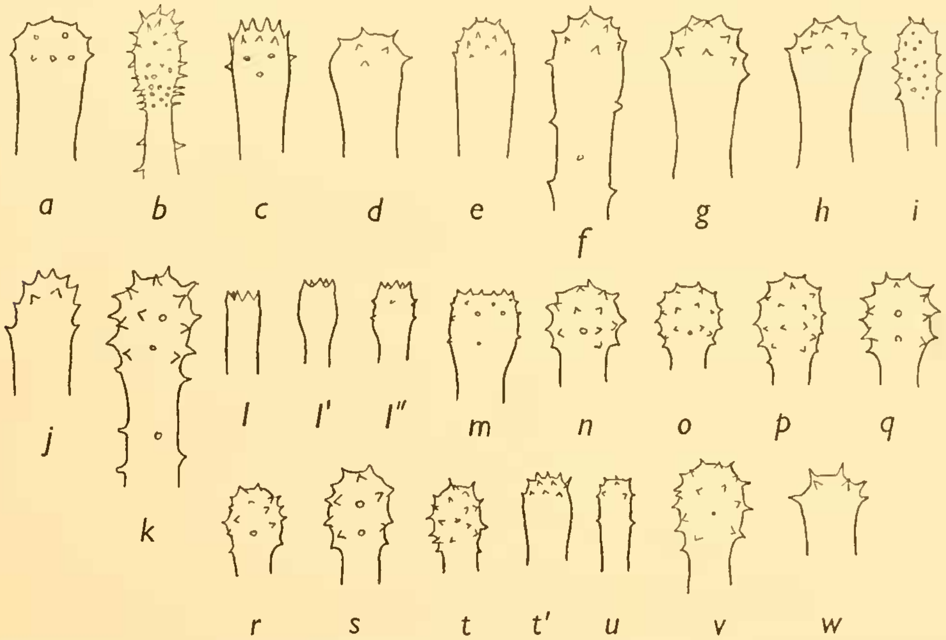

Fig. 22. *Iophon proximum* (Ridley): showing variation in ends of tornota. *a*, *I. chelifer ostia-magna*, Wilson (type); *b*, *I. chelifer*, Ridley and Dendy (co-type: B.M. 87. 5. 2. 157); *c*, *I. chelifer*, Ridley and Dendy (type); *d*, *I. chelifer*, Ridley and Dendy (Lambe's specimen); *e*, *G 109*; *f*, *I. indentatus*, Wilson (type); *g*, *I. lamella indivisus*, Wilson (type); *h*, *I. lamella*, Wilson (type); *i*, *I. pattersoni* (Bowerbank), Ridley and Dendy (Challenger Sts. 308 and 311); *j*, *I. chelifer*, Ridley and Dendy (Thiele's specimen); *k*, *D 255*; *l–l''*, *D 256*; *m*, *D 251*; *n*, *D 739*; *o*, *D 740*; *p*, *D 257*; *q*, *D 254*, *D 258*; *r*, *D 431*; *s*, *D 252*; *t*, *t'*, *D 837*; *u*, *D 430*; *v*, *Alebion proximum*, Ridley (type); *w*, *Iophon proximus* (Ridley), var. *reticularis*, Hentschel. All figures × 1200. Figs. *a*, *f*, *g*, *h* after Wilson; fig. *d* after Lambe; fig. *j* after Thiele. Fig. *w* from a preparation from the type.

specimens with a single species. Some of the variations can be correlated, but only vaguely, with increase in size, but nowhere is there so clearly marked a sequence as I have described (1930) in *I. radiatus*, Topsent. For example, with increase in size the specimen tends to become flabellate, either erect or spreading over the substratum; generally, the average size of the main acanthostyli and the tornota tends to increase, but the tendency is not well marked; the dermal skeleton is regular in young encrusting individuals and becomes more diffuse and irregular in the larger forms, but is never lost; and the bipocilla tend to become trifoliate (or bifoliate) as the specimen increases in size.

Other interesting features of the skeleton are: (1) the frequency with which the

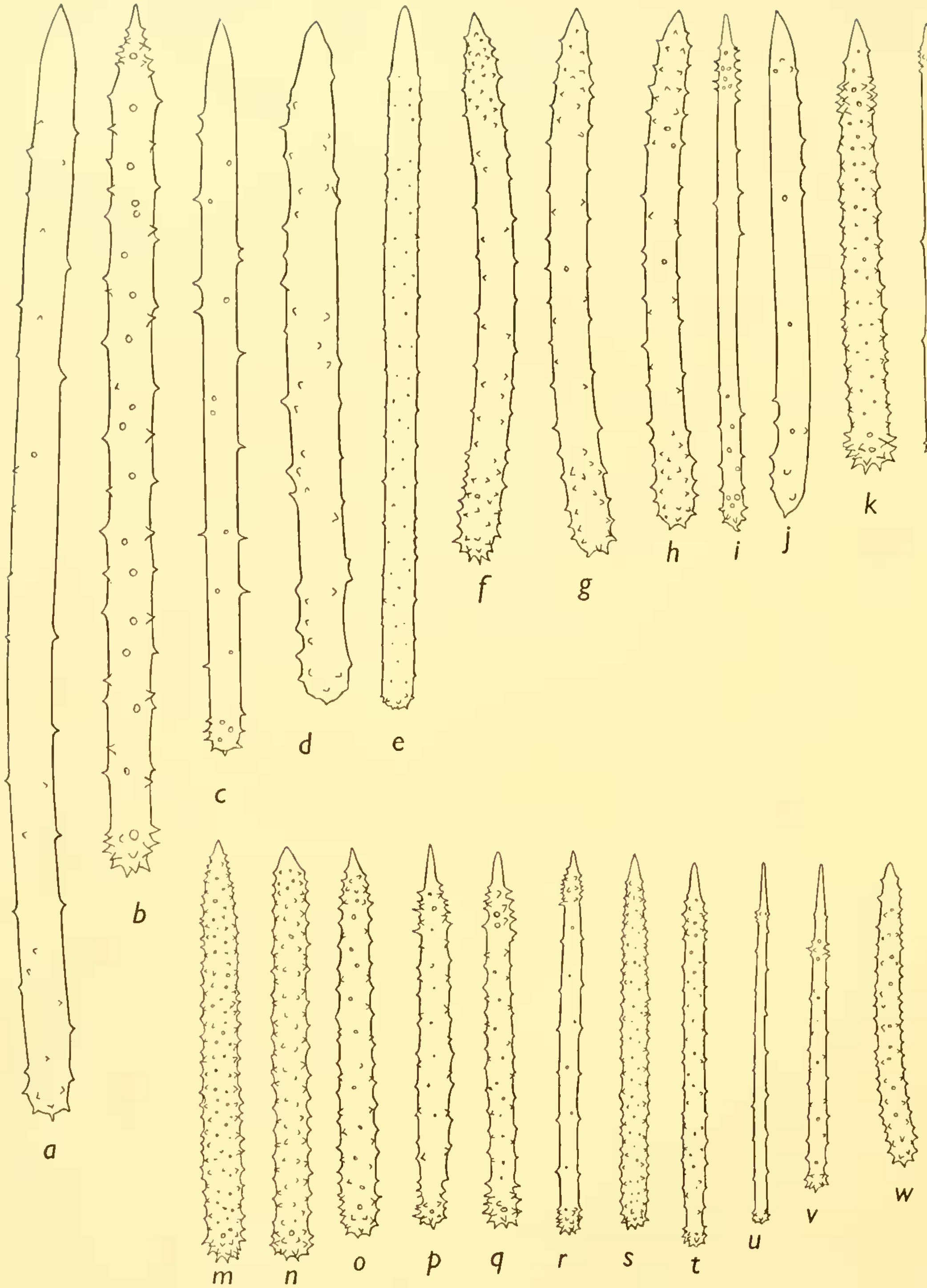

Fig. 23. *Iophon proximum* (Ridley), showing variation in size and shape of the main acanthostyli. *a*, *I. chelifer ostia-magna*, Wilson (type); *b*, *I. chelifer*, Ridley and Dendy (co-type: B.M. 87. 5. 2. 157); *c*, *I. chelifer*, Ridley and Dendy (type); *d*, *I. chelifer*, Ridley and Dendy (Lambe's specimen); *e*, *G 109*; *f*, *I. indentatus*, Wilson (type); *g*. *I. lamella indivisus*, Wilson (type); *h*, *I. lamella*, Wilson (type); *i*, *I. pattersoni* (Bowerbank), Ridley and Dendy (Challenger Sts. 308 and 311); *j*, *I. chelifer*, Ridley and Dendy (Thiele's specimen); *k*, *D 255*; *l*, *D 256*; *m*, *D 251*; *n*, *D 739*; *o*, *D 740*; *p*, *D 257*; *q*, *D 254*, *D 258*; *r*, *D 431*; *s*, *D 252*; *t*, *D 837*; *u*, *D 430*; *v*, *Alebion proximum*, Ridley (type); *w*, *Iophon proximus* (Ridley), var. *reticularis*, Hentschel. All figures × 300. Figs. *a*, *f*, *g*, *h* after Wilson; fig. *d* after Lambe; fig. *j* after Thiele. Fig. *w* from a preparation from the type.

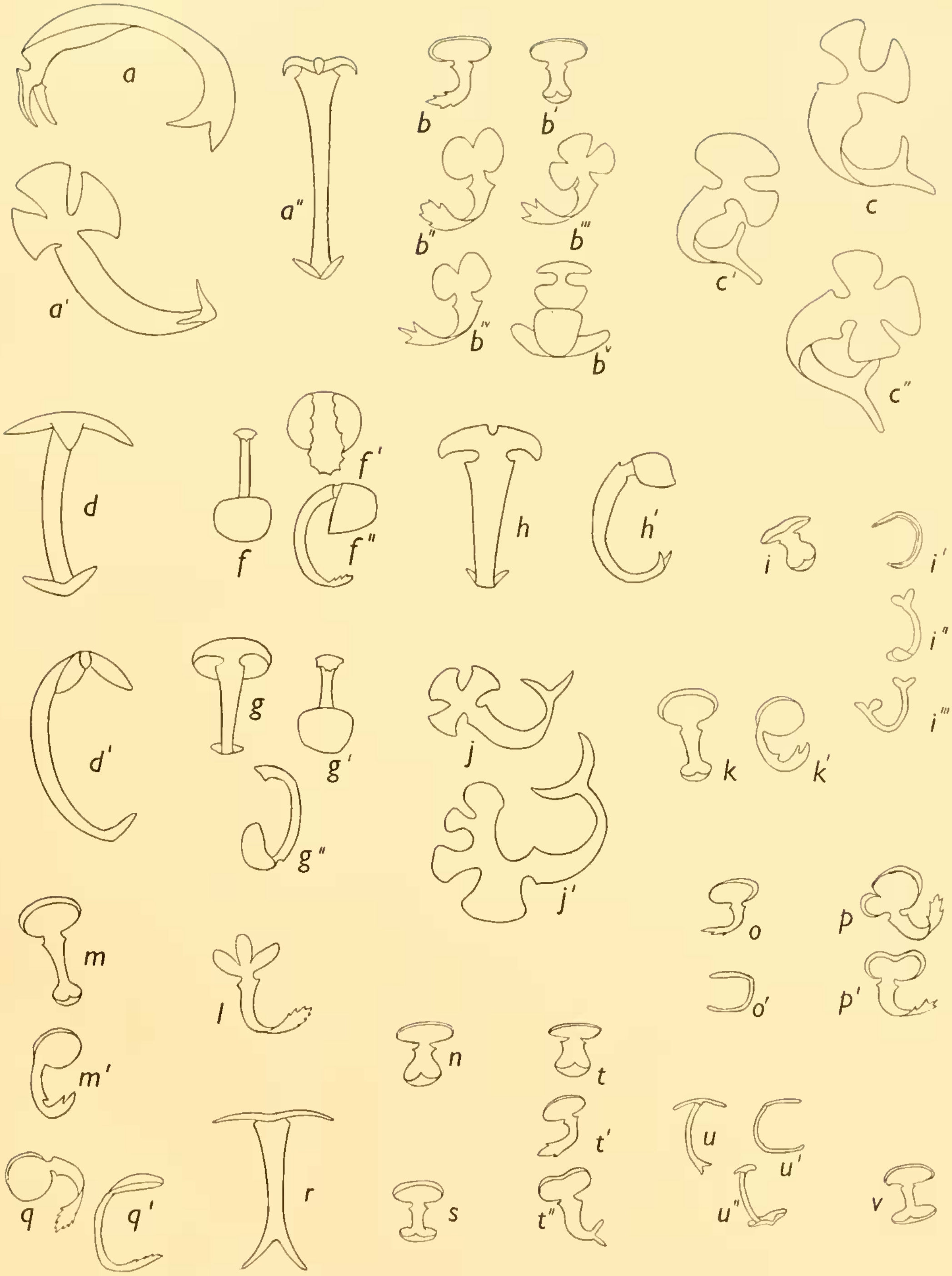

Fig. 24. *Iophon proximum* (Ridley), showing variation in size and shape of bipocilla. *a*, *I. chelifer ostia-magna*, Wilson (type); *b*, *I. chelifer*, Ridley and Dendy (co-type: B.M. 87. 5. 2. 157), *b* and *b'* are occasionally met, but b''–b^{v} represent the normal; *c*, *I. chelifer*, Ridley and Dendy (type); *d*, *I. chelifer*, Ridley and Dendy (Lambe's specimen); *f*, *I. indentatus*, Wilson (type); *g*, *I. lamella indivisus*, Wilson (type); *h*, *I. lamella*, Wilson (type); *i*, *I. pattersoni* (Bowerbank), Ridley and Dendy, *i* is the normal spicule, *i'* is a side view of the same, and i''–i''' are rarely met with; *j*, *I. chelifer*, Ridley and Dendy (Thiele's specimen); *k*, *D 255*; *l*, *D 256*; *m*, *D 251*; *n*, *D 739*; *o*, *D 740*; *p*, *D 257*; *q*, *D 254*, *D 258*; *r*, *D 431*; *s*, *D 252*; *t*, *D 837*; *u*, *D 430*; *v*, *Alebion proximum*, Ridley (type). All figures × 1800. Figs. *a*, *f*, *g*, *h* after Wilson; fig. *d* after Lambe; fig. *j* after Thiele.

echinating acanthostyli, persistently overlooked by previous authors, may occur (cf. Table, p. 297); (2) the variation in the occurrence and distribution of the anisochelae and bipocilla.

Distribution. Kerguelen; Cape of Good Hope; Tristan da Cunha; South America (Patagonia and Chile); Galapagos Islands; Canada (Pacific and Atlantic coasts).

Section *TEDANIEAE*

Genus Tedania, Gray

(For further notes on the Antarctic species of this genus see p. 342.)

Tedania tenuicapitata, Ridley (Fig. 25*f*).

T. tenuicapitata, Ridley, 1881, p. 124, pl. xi, fig. 1.

Occurrence. St. WS 73: Falkland Islands, 121 m.; St. WS 76: Falkland Islands, 205–207 m.; St. WS 79: Falkland Islands, 131–132 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 99: Falkland Islands, 251–225 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 248: Falkland Islands, 210–242 m.; St. WS 250: Falkland Islands, 251–313 m.

Remarks. The holotype of *T. tenuicapitata*, Ridley is a small sub-pyramidal sponge, from Chile, probably incomplete, and its external characters are thus somewhat obscure. Its surface is even, minutely punctate, with several oscules, 2 mm. in diameter, on the upper margin. The spicules are: styli 0·38 by 0·013 mm., tornota 0·28 by 0·006 mm., and onychaeta 0·08–0·105 mm. and 0·32 mm. respectively. The several specimens assigned to this species by Ridley and Dendy (1887) vary from small and irregularly massive to flabellate, and form in themselves a well-graded series of transitions from the holotype to the large flabellate specimen illustrated by these authors (*loc. cit.*, pl. xi, fig. 5). The surface may be almost smooth or thrown into meandrine folds, to an extent far greater than suggested by Ridley and Dendy's illustration; and there are all stages between these two extremes. Thus, in one specimen the surface is smooth and even, but beneath the dermis, and visible through it, the underlying tissues have a meandrine formation such as is seen in *Artemisina dianae*, Topsent (1908, pl. iii, fig. 4). In extreme cases, the surface is folded like that of *Tedania oxeata*, Topsent (1917, pl. iv, fig. 14). The spicules in the Challenger specimens measure: styli 0·35–0·49 by 0·007–0·014 mm., tornota 0·28–0·3 by 0·004–0·006 mm., and onychaeta 0·07–0·28 mm., with no apparent division into groups of different sizes.

The present specimens vary in form and appearance to a slightly greater extent than the Challenger specimens, but are still massive to flabellate, with all intermediate forms between these two, and the surface is even, with the underlying tissues thrown into meandrine folds of varying size, or itself thrown into coarse and conspicuous meandrine folds. The spicules measure: styli 0·35–0·49 by 0·01–0·018 mm., tornota 0·18–0·39 by 0·004–0·011 mm., onychaeta, very variable, not always clearly differentiated into groups of different sizes, but on the whole they may be represented by the measurements 0·07–0·18 mm. and 0·28–0·43 mm.

Distribution. Chile.

Tedania massa, Ridley and Dendy (Fig. 25).

T. massa, Ridley and Dendy, 1886, p. 335; *id.*, *loc. cit.*, 1886, p. 53, pl. xi, fig. 4, pl. xxiii, fig. 2; *Paratedania tarantula*, Burton, 1929, p. 441. (For further synonymy see Burton, *loc. cit.*)

Occurrence. St. 42: South Georgia, 120–204 m.; St. 148: South Georgia, 132–148 m.; St. 152: South Georgia, 245 m.; St. 156: South Georgia, 200–236 m.; St. 158: South Georgia, 401–411 m.; St. 159: South Georgia, 160 m.; St. 160: Shag Rocks, 177 m.; St. 175: South Shetlands, 200 m.; St. 180: Palmer Archipelago, 160–330 m.; St. 181: Palmer Archipelago, 160–335 m.; St. WS 80: Falkland Islands, 152–156 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 82: Falkland Islands, 140–144 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 87: Falkland Islands, 96–127 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 93: Falkland Islands, 133–130 m.; St. WS 109: Falkland Islands, 145 m.; St. WS 216: Falkland Islands, 219–133 m.; St. WS 225: Falkland Islands, 161–162 m.; St. WS 231: Falkland Islands, 167–159 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 244: Falkland Islands, 253–247 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 248: Falkland Islands, 210–242 m.; St. WS 250: Falkland Islands, 251–313 m.

REMARKS. Topsent (1917, p. 59), in recording *Tedania charcoti* for the third time, included under this name four specimens having the same spiculation as the holotype of the species but possessing a peculiar external form combined with a chitinoid ectosome and a dermal tangential reticulation of styli instead of the brushes of tornota set at right angles to the surface. Later, I established the synonymy of these specimens with *Oceanapia tarantula* (Kirkpatrick) and removed the species to *Paratedania*. More specimens have come to hand in the present collection, and in the light of these it is clear that Topsent's action in treating this form as a simple variety of *T. charcoti* was nearer the truth than I had thought. In one jar, for example, there are five specimens. The largest is sub-spherical, about 11 cm. in greatest diameter, and differs in no obvious respect from the rounded specimens of *T. charcoti* described by Topsent (1913, p. 630, pl. v, figs. 3, 7). The same may be said of the smallest. A third specimen (Fig. 25 *a*) is fixed to a fragment of shell, and around the base of the sponge runs a narrow belt of chitinoid ectosome, the rest of the sponge being no different apparently from the first and second specimens. This chitinoid substance is also secreted around a portion of the shell. In a fourth specimen the chitinoid belt is wider, and just above it is an ill-defined, discontinuous pore area (Fig. 25 *b*). The upper part of the sponge, not covered with chitinoid ectosome, is again indistinguishable from the spherical form of *T. charcoti*. In the fifth (Fig. 25 *c*) specimen, the chitinoid covering is more extensive. The only differences from *T. charcoti* observed in these specimens, apart from the chitinoid ectosome, are (1) that the ends of the tornata tend to be more irregular and occasionally slightly spined; (2) the oscules tend to become papillate as the chitinoid ectosome increases; (3) beneath this special ectosome the brushes of tornota are lost and the dermal skeleton is composed of a tangential reticulation of styli (which may sometimes be modified to strongyla); (4) some, at least, of the pores become grouped into a meridional pore area; (5) the onychaeta are more liable to bear a swelling near one end (= tylorhaphides of Dendy). Typical specimens of *Paratedania tarantula* merely show an extreme form of this chitinoid development (Fig. 25 *d*, *e*). Despite the great difference between forms such as those shown in Figs. 25 *a*, *b* and 25 *d*, *e*, there is every reason to suppose that the one may develop from the other and that they are conspecific. Further, it is almost certain that the tangential skeleton of styli, the irregularity of the tornota, etc., are correlated with the development of the chitinoid ectosome and may

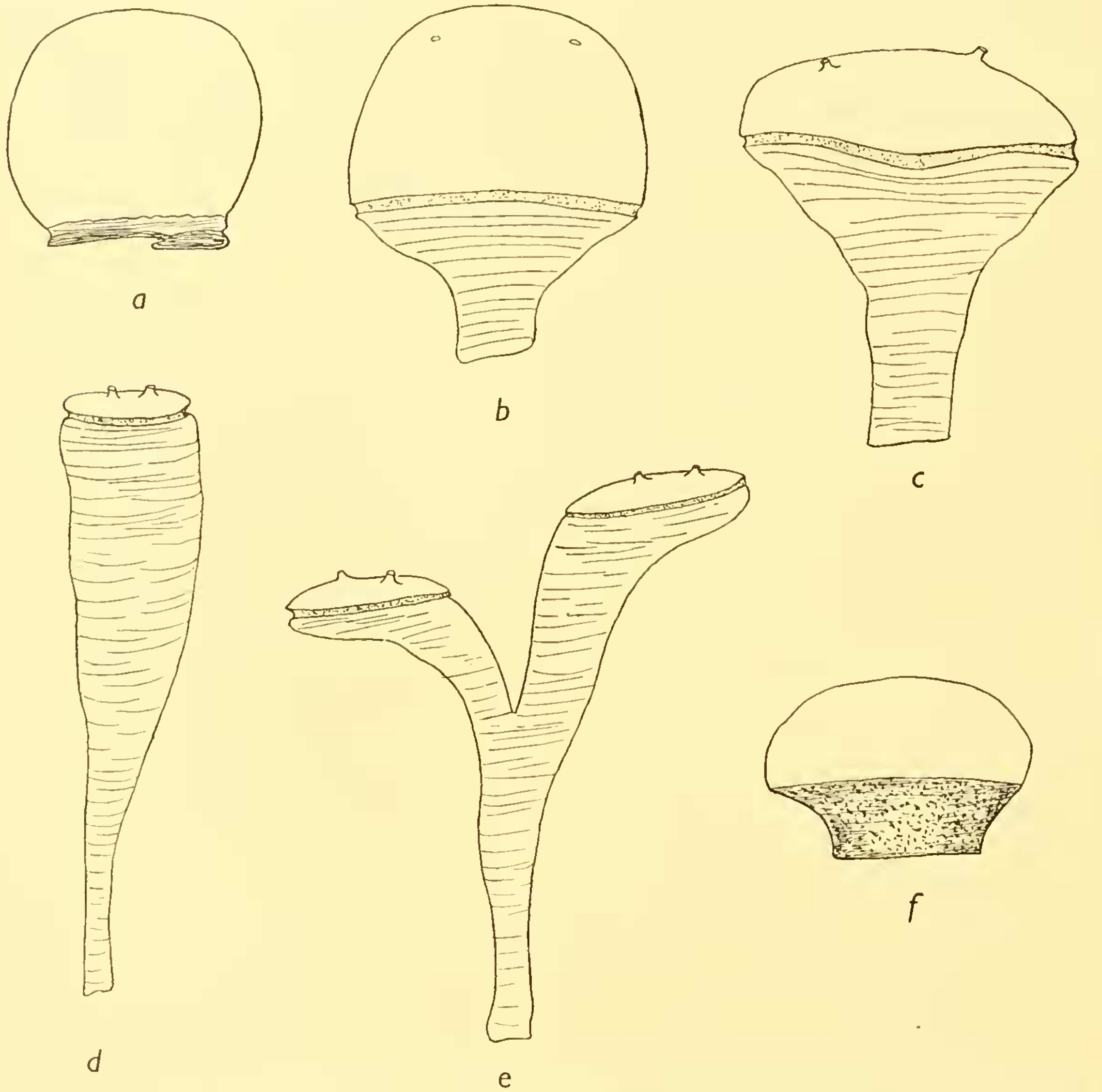

Fig. 25. *a–e*, *Tedania massa*, Ridley and Dendy, showing some of the variations in external form; *f*, *Tedania tenuicapitata*, Ridley, showing similarity of form due to the growth of an encrusting *Haliclona* around the basal half.

possibly be induced by it. What gives rise to this ectosome is, however, still a mystery; but it is interesting to note that in some of the more typical individuals of *T. massa* irregularly rounded patches of such an ectosome occasionally occur and that their presence is always accompanied by some derangement of the outer layers of the skeleton, although a tangential layer of styli may not have been formed. This cuticle is so conspicuous in several specimens that it is difficult to understand why Ridley and Dendy should have failed to mention it.

(An interesting case is shown in Fig. 19 *f* where the base of a specimen of *T. tenuicapitata* is covered with an encrusting *Haliclona* sp. and the sponge has the superficial appearance of certain specimens of *T. massa*.)

Tedania vanhöffeni, Hentschel, has so much in common with certain specimens of *Paratedania tarantula* that there can be little doubt as to their identity, but re-examination of the type is necessary to establish this beyond doubt. Further, since the spiculations of *Tedania vanhöffeni* and *T. actiniiformis* are so similar it is probable that the latter may also be included eventually in the same species.

Paratedania tarantula (Kirkpatrick), originally described from Victoria Land, has the following well-marked characteristics: Form carrot-shaped, with most of the surface covered by a thick, light brown cuticle and having a well-marked, equatorial pore area immediately above the upper limits of the cuticle; spicules all of large size. According to the limits of the species established by me (1929, p. 441), which further research has not caused me to modify, the dimensions of the spicules are: styli 0·437–0·504 by 0·018–0·04 mm., tornota 0·344–0·504 by 0·007–0·012 mm., onychaeta of two sorts 0·064–0·162 and 0·4–0·76 mm. These measurements are, on the whole, greater than those of any other species hitherto described from the Antarctic or adjacent localities, except *Tedania massa*, Ridley and Dendy. Further, in eight specimens from the present collection, typical in all other respects, the sizes of the spicules are: styli 0·63–0·78 by 0·028–0·04 mm., tornota 0·32–0·35 by 0·007–0·011 mm., and onychaeta 0·07–0·28 and 0·6–0·7 respectively. The species seemed therefore to be characterized by the large size of its spicules and by the peculiarities of external form.

There are, however, several specimens which differ somewhat in external form but which would necessarily be included in the species. Thus, in six specimens from South Georgia, the form varies from carrot-shaped to massive and sub-spherical, with the cuticle restricted to the base of the sponge (cf. also p. 304, Fig. 25). In these, the dimensions, and other characters, of the spicules conform to the measurements given above as typical of the species. On the other hand, there are from the Falkland Islands eleven specimens, varying in form from carrot-shaped to massive and sub-spherical, with the cuticle restricted to the base of the sponge, in which the spicules have the following dimensions: styli 0·46–0·59 by 0·01–0·017 mm., tornota, 0·35 by 0·009 mm., and onychaeta 0·07–0·19 and 0·4–0·6 mm. respectively. Thus, the styli here are noticeably more slender than in those recorded above.

(It may be noted here, that whereas most of the Falkland Islands specimens are atypical in form, the onychaeta and tornota show the same characteristics, and the styli the same tendency to modification to strongyla, though to a lesser degree, as the Antarctic specimens.)

Following on this are three specimens from the Falkland Islands having the skeleton typical of *Paratedania tarantula*, but having a more atypical shape than the preceding specimens. The smallest is spherical, 10 cm. in diameter, and the largest sub-pyramidal and 20 cm. high. None is complete, the base being absent or damaged in each case, but in only one is there any sign of a cuticle, and in that it is restricted to a small patch on one side of the sponge.

The next batch of three, also from the Falklands, have a similar form, but more irregular, and they are larger. The spiculation again is typical of *P. tarantula*. Here, however, there is no sign of a cuticle; but the specimens contain embryos, and these are identical with the embryos found in the other groups of individuals referred to above as belonging to this species. There can therefore be no doubt, on embryological evidence as well as on spicular characters, that the carrot-shaped specimens of *P. tarantula*, the massive specimens with a restricted cuticle, and the large spherical or pyramidal specimens without cuticle are conspecific.

Another specimen, also from Falkland Islands, is unattached and discoid (cf. Fig. 56 *a*), but has the same spiculation and embryology as the other specimens of *P. tarantula*.

Turning now to *Tedania massa*, Ridley and Dendy, with which species *Paratedania tarantula* is most closely allied in spiculation, I find that the types of this species are as follows: holotype and first co-type, large, massive or sub-pyramidal sponges, with extensive cuticle-covered areas at the base, resembling Fig. 25 *b* in general appearance but much larger in size; massive and without cuticle; small and encrusting (on the back of a crab), without cuticle[1]; and large and thinly flabellate, again without cuticle.[2] Moreover, the embryos of *Tedania massa* are identical with those of *Paratedania tarantula*, so that the species must be considered synonymous.

Finally, a group of a dozen specimens, also from the Falklands, belong here but vary in form from massive, spherical and flabellate (all fixed ?) to discoid and unattached, but in none of them can any trace of a cuticle be found.

Distribution. South America; Victoria Land; Wilhelm Land; Graham Land.

Tedania spinata (Ridley).

Trachytedania spinata, Ridley, 1881, p. 122, pl. x, fig. 10.

Occurrence. St. 51: Falkland Islands, 105–115 m.; St. 222: Cape Horn, 70–75 m.; St. WS 72: Falkland Islands, 79 m.; St. WS 75: Falkland Islands, 72 m.; St. WS 76: Falkland Islands, 205–207 m.; St. WS 77: Falkland Islands, 110–113 m.; St. WS 79: Falkland Islands, 131–132 m.; St. WS 80: Falkland Islands, 152–156 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 91: Falkland Islands, 191–205 m.; St. WS 95: Falkland Islands, 108–109 m.; St. WS 108: Falkland Islands, 118–120 m.; St. WS 109: Falkland Islands, 145 m.; St. WS 210: Falkland Islands, 161 m.; St. WS 222: Falkland Islands, 100–106 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 249: Falkland Islands, 166 m.

Remarks. The holotype of *Trachytedania spinata*, Ridley, forms a thin crust on the valves of a *Pecten*. Its spiculation consists of smooth or basally spined styli 0·16–0·19 by 0·006 mm., tornota 0·18 by 0·004 mm., and onychaeta up to 0·15 mm. There are, in the present collection, a number of specimens which appear to belong to this species.

[1] Specimen from St. 163 D (i.e. Australia). The station reference is queried in the original label.

[2] The "encrusting" sponge of Ridley and Dendy.

In these the spicules are smooth styli, with occasional spines near the base, 0·21–0·28 by 0·005–0·011 mm., tornota 0·18–0·21 by 0·004–0·007 mm., and onychaeta varying in length from 0·052 to 0·21 mm., not divided into groups of varying size. The specimens here assigned to *Tedania spinata* (Ridley) vary in form from sub-spherical (rarely), irregularly massive (rarely), branched, with stout cylindrical branches, to flabellate (the typical form) or discoid and unattached. The surface is typically smooth, even, punctured by commensal Amphipods and the dermis is typically tough and readily separable from the underlying tissues. Oscules, usually of small size, may be found scattered generally over the surface or, in flabellate and discoid forms, around the margins.

The styli are, for the most part, smooth, but there is an occasional tendency to a slight subtylostylote swelling to the base. In addition, spines may occur. The occurrence of the spines is, however, not only rare but very sporadic. For example, in a single section all the styli will be found to be smooth except for a small group situated at one point. Or, again, the spicules may be smooth with perhaps two or three basally spined forms found at rare intervals. Turning now to the holotype, the significance of this spining can be readily appreciated. In sections taken at right angles to the substratum it is found that the styli at the bases of the vertical columns are the most conspicuously spined and those towards the surface are hardly spined at all. Moreover, small acanthostyli, remarkably like those, to be described later, found in the embryos of the specimens here assigned to *T. spinata*, are very occasionally to be found associated with the normal basally spined styli set on the substratum. It seems probable therefore that the holotype of this species represents nothing more than the immediate post-fixation form of the species; that there is retained in the adult a tendency to the formation of spines on the styli, and that this tendency, although almost wholly suppressed in the adult, is yet found in occasional spicules.

DISTRIBUTION. Chile.

Tedania charcoti, Topsent.

T. charcoti, Topsent, 1908, p. 30, pl. i, fig. 3, pl. iii, fig. 3, pl. v, fig. 6; 1913, p. 630, pl. v, figs. 3–7; *nec* Topsent, 1917.

Occurrence. St. 39: South Georgia, 179–235 m.; St. 140: South Georgia, 122–136 m.; St. 145: South Georgia, 26–35 m.; St. 146: South Georgia, 728 m.; St. 148: South Georgia, 132–148 m.; St. 152: South Georgia, 245 m.; St. 158: South Georgia, 401–411 m.; St. 160: Shag Rocks, 177 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 42: South Georgia, 198 m.

The nineteen specimens range from a few centimetres in longest diameter to nearly 20 cm. From the structure of the skeleton it is possible to divide this group into two smaller groups; the first, of five specimens, is characterized by a dense skeleton and thick spicules (styli 0·36–0·49 by 0·02–0·031 mm.), with the dermal skeleton composed of a very dense palisade of stout tornota (measuring 0·32–0·39 by 0·014–0·021 mm.). The second group, of eleven specimens, is characterized by a loose skeleton composed of few spicules, mainly slender (styli 0·35–0·52 by 0·011–0·021 mm.), with a diffuse dermal skeleton of slender tornota (measuring 0·24–0·34 by 0·007–0·009 mm.). There are in addition three specimens with skeletons somewhat intermediate in character between those of these two groups. In external form the specimens of each group show the same variations; from massive with digitate or flabellate processes, to massive, with the surface raised into low rounded prominences, and, in rare cases, sub-clathrate. Further, all the five specimens of the first group are from St. WS 27 (South Georgia, 106·9 m. depth) and four of the second group are from the same locality. The remaining specimens of group 2 are also from South Georgia, from depths varying between 132 and 411 m. The similarity in external form between the members of the two groups, the presence of intermediates as regards skeleton structure, and the similarity between the two groups in spiculation, except for size of spicules and numbers present, suggest that there is no taxonomic significance in this sub-division. Similarly, since all the specimens from the first, and a third of the specimens from the second group are from the same station, an ecological significance is hardly a possibility. It is, however, remarkable that seven specimens of group 2, out of a total of eleven, contain embryos while none of the specimens of group 1 has any. Possibly the looseness of the skeleton may have something to do with the development of the embryos, and we may therefore accept all nineteen as conspecific.

Several of the specimens of this group are almost identical with the co-type of *Tedania charcoti*, Topsent (1908, pl. iii, fig. 3). One or two of them approximate fairly closely to the holotype (*id.*, *loc. cit.*, pl. i, fig. 3), and there are several which differ slightly from both. There can, however, be little doubt that all belong to *T. charcoti*. Here, however, another point arises: Topsent (1908) records only two sorts of onychaeta in his specimens, but in the present specimens exceptions are found to this. In the types of this species, these spicules measure 0·09–0·12 and 0·25–0·265 mm. long. In eleven of the present specimens three sizes of onychaeta were found, the smallest measuring from 0·05 to 0·105 mm., with an average of 0·08 mm., the largest, 0·24–0·32 mm., with an average of 0·29 mm. Intermediate sizes were found, admittedly rare, varying from 0·105 to 0·24 mm., with an average of 0·163 mm. In six specimens, no intermediates were found, but in two specimens four separate categories appeared to be present. Moreover, in some specimens the onychaeta were rare, in others commonly present, and in rare cases so abundant that they formed the bulk of the skeleton. It does not seem possible therefore to use the onychaeta for the determination of species.

Distribution. Graham Land; Burdwood Bank.

Tedania murdochi, Topsent.

T. murdochi, Topsent, 1913, p. 629, pl. v, fig. 5.

Occurrence. St. 53: Falkland Islands, 0–2 m.

Remarks. The typical form of *T. murdochi*, Topsent (1913, pl. v, fig. 5), is massive, with mammiform lobes bearing oscules at their summits. The surface is usually wrinkled, and in the present specimens has somewhat the appearance presented by the holotype of *T. charcoti*, Topsent (1913, pl. i, fig. 3). The colour is deeper than in the other Antarctic species, being a deep olive-green or greenish brown. The spicules of the holotype are: styli 0·235 by 0·008 mm., tornota 0·22 by 0·005 mm., and onychaeta, not differentiated into two groups, 0·04–0·175 mm. In the present specimens the sizes are: styli 0·21–0·22 by 0·007 mm., tornota 0·18–0·2 by 0·004–0·005 mm., and onychaeta 0·07–0·21 mm.

Distribution. Falkland Islands.

Tedania oxeata, Topsent.

T. oxeata, Topsent, 1916, p. 169; 1917, p. 61, pl. iv, fig. 14, pl. vi, fig. 19; Burton, 1929, p. 441.

Occurrence. St. 170: Clarence Island, 342 m.

Distribution. Graham and Victoria Lands.

Section *MYXILLEAE*

Genus **Myxilla**, Schmidt

Myxilla mollis, Ridley and Dendy (Plate LV, figs. 1–4).

Myxilla mollis, Ridley and Dendy, 1886, p. 471; *M. spongiosa*, *id.*, *loc. cit.*, p. 471; *M. mollis*, *id.*, 1887, p. 133, pl. xxvii, fig. 4; *M. spongiosa*, *id.*, *loc. cit.*, p. 134, pl. xxvii, fig. 3; Kirkpatrick, 1908, p. 28; Hentschel, 1914, p. 97, pl. vii, fig. 5; *M. magna*, Topsent, 1916, p. 168; *id.*, 1917, p. 56, pl. iii, fig. 4, pl. vi, fig. 9.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 123: South Georgia, 230–250 m.; St. 159: South Georgia, 160 m.; St. 175: South Shetlands, 200 m.; St. 181: Palmer Archipelago, 160–335 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 42: South Georgia, 198 m.; St. WS 76: Falkland Islands, 205–207 m.; St. WS 79: Falkland Islands, 131–132 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 88: Falkland Islands, 118 m.; St. WS 99: Falkland Islands, 251 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 244: Falkland Islands, 253–247 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 247: Falkland Islands, 172 m.; St. WS 250: Falkland Islands, 251–313 m.; St. MS 71: South Georgia, 120–60 m.

Diagnosis. Young sponge cylindrical or flabellate, with smooth, even surface; adult sponge massive, sub-spherical or massively flabellate with surface more or less conulose, or thrown into low, rounded tubercles; main skeleton, at all times, ranging from regularly isodictyal to sub-isodictyal with triangular meshes, often irregularly confused; dermal skeleton a tangential layer of tornota in young sponges, which is gradually lost with maturity, tornota being then arranged in dermal brushes or else almost absent from dermis; megascleres smooth, straight or curved styli or, occasionally, subtylostyli with long oval heads, with one or a few spines at base in young forms; microscleres ancorae spatuliferae and sigmata, both forms being very variable in size or even, occasionally, separated into two or more categories.

Remarks. The species is represented by twenty-one specimens which show that the variations are of two kinds, due to (1) the fluctuating variations in size of spicule, arrangement of skeleton and external form, and (2) the changes which accompany maturity.

The variation in the external form is not considerable and the present specimens agree closely in this, and in the texture, with the holotype. The form ranges from irregularly massive to sub-spherical or flabellate. The surface may be minutely conulose or thrown into conspicuous rounded tubercles. The largest flabellate specimen measures 9 cm. high, by 9 cm. across, by 4 cm. thick. The largest sub-spherical specimen is 7 cm. in diameter. The smallest is sub-spherical and 1 cm. in diameter.

The skeleton varies between regularly isodictyal, with polyspicular primary fibres joined at intervals by horizontally arranged single spicules, and sub-isodictyal, with triangular meshes.

DISTRIBUTION. Graham Land; Wilhelm Land; Victoria Land; east coast of South America up to mouth of Rio de la Plata.

Myxilla australis (Topsent) (Plate LIV, fig. 6).

Dendoryx incrustans, var. *australis*, Topsent, 1901, p. 7; *id.*, 1901, p. 17, pl. iii, fig. 11; *Myxilla australis*, *id.*, 1917, p. 53, pl. vi, fig. 10.

Occurrence. St. 190: Palmer Archipelago, 93–130 m.; St. WS 27: South Georgia, 106–109 m.

DIAGNOSIS. Sponge encrusting or massive; surface smooth, uneven, minutely reticulate; oscules large, conspicuous, leading into deep cloacal cavities; pores scattered generally over surface; dermal membrane readily separable, translucent, showing large sub-dermal cavities beneath; colour, in spirit, white; main skeleton a sub-isodictyal reticulation of spined styli; dermal skeleton composed of numerous loose bundles of tornota, set at right angles to surface, with outer ends supporting a tangential reticulation of similar spicules; styli of main skeleton, sparingly spined throughout length, 0·44–0·6 by 0·015–0·018 mm.; tornota, usually in form of straight, slender styli, bearing scattered spines at each end, 0·27–0·35 by 0·008–0·01 mm.; tridentate isochelae of two sizes, larger 0·047–0·06 mm., and smaller 0·024 mm. long; sigmata 0·03–0·06 mm.

REMARKS. The present specimen appears to agree closely with the holotype of the species, except for the presence of the second type of chelae. Since these are small and not numerous, it is possible that Topsent overlooked them in his original examinations.

DISTRIBUTION. Graham Land.

Myxilla asigmata, Topsent.

M. spongiosa, var. *asigmata*, Topsent, 1901, p. 18; *Lissodendoryx spongiosa*, var. *asigmata*, *id.*, 1908, p. 26, pl. iii, fig. 1; *Myxilla spongiosa*, var. *asigmata*, *id.*, 1913, p. 625, pl. iii, fig. 3; Hentschel, 1914, p. 99.

Occurrence. St. 145: off South Georgia, 26–35 m.

REMARKS. Of the specimens hitherto recorded the majority have been encrusting or massive but spreading. That described by Topsent (1913) was, however, pyriform and slightly pedunculate. In all the surface is slightly conulose. The present specimen therefore appears to correspond fairly closely with that described by Topsent (*loc. cit.*), but is more complete and better preserved than any yet recorded. It is pyriform and pedunculate, 70 mm. high, and 60 mm. by 25 mm. across the top. Several small oscules are situated on the upper surface. The general surface of the sponge is even, glistening when removed from the alcohol, and very minutely conulose.

The dimensions of the spicules are the smallest on record. Those of the previously described specimens range as follows: styli 0·495–0·9 by 0·02–0·028 mm., tornota 0·285–0·4 by 0·007–0·01 mm., chelae 0·04–0·075 mm. Those of the present specimen are: styli 0·3 by 0·009 mm., tornota 0·18 by 0·006 mm., chelae 0·03–0·063 mm. The most noticeable feature of this variation in spicule size is that although the two categories of megascleres vary considerably in size, the chelae are almost constant. This holds true for most species of sponges, that while the microscleres may be almost constant in size, the megascleres may be subject to very large ranges of variation.

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Myxilla chilensis, Thiele (Plate LIV, fig. 10).

M. chilensis, Thiele, 1905, p. 443, figs. 22, 62.

Occurrence. St. 58: Falkland Islands, 0–5 m.

REMARKS. The single example is growing in intimate association with an alga, the sponge tissues forming a thin coating on the branches of the alga. The skeleton is quite typical except that the acanthostyli are smaller than those of the holotype and are more tapering at the distal end, resembling more the acanthostyli of *Hymedesmia laevis*, Thiele (*loc. cit.*, pl. xxxi, fig. 69 *b*).

DISTRIBUTION. Chile.

Myxilla elongata, Topsent.

M. elongata, Topsent, 1916, p. 168; 1917, p. 54, pl. iv, fig. 3, pl. vi, fig. 11; Burton, 1929 p. 435.

Occurrence. St. 158: South Georgia, 401–411 m.; St. 160: Shag Rocks, 177 m.

REMARKS. The two specimens agree closely in all respects, the larger being irregularly lobose and white in colour, with smooth but even surface. Both differ from the type in size, the arrangement of the tornota, the more feeble spining of the tornota, and in the presence of echinating acanthostyli (see Burton, *loc. cit.*).

DISTRIBUTION. Graham Land; Victoria Land.

Myxilla basimucronata, sp.n. (Fig. 26).

Holotype. B.M. 28. 2. 15. 462.

Occurrence. St. 42: South Georgia, 120–204 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 42: South Georgia, 198 m.

DIAGNOSIS. Sponge of small size, sub-ramose with cylindrical branches or forming dorso-ventrally flattened lobes; surface smooth, even; dermal membrane readily separable; sub-dermal cavities spacious; pores and oscules not apparent; colour, in spirit, pale brown; main skeleton a regular reticulation of smooth styli, 0·47 by 0·017 mm., slightly curved and bearing a basal mucron; dermal skeleton a tangential layer of tornota regularly crossing each other in all directions, supported by brushes of tornota planted directly on distal ends of ascending fibres of main skeleton; tornota inequiended, 0·25 by 0·008 mm., with ends slightly swollen and bearing a terminal mucron surrounded by numerous microspines; microscleres sigmata of two sizes, 0·042 and 0·025 mm. chord, and ancorae spatuliferae of two sizes, 0·042 and 0·021 mm. chord.

REMARKS. The species is very closely related to *M. magna*, Topsent, and it is indeed possible that the two may eventually prove to be identical, but the present species differs from Topsent's species in external form, in the dimensions of its spicules and in the presence of a basal mucron on the styli.

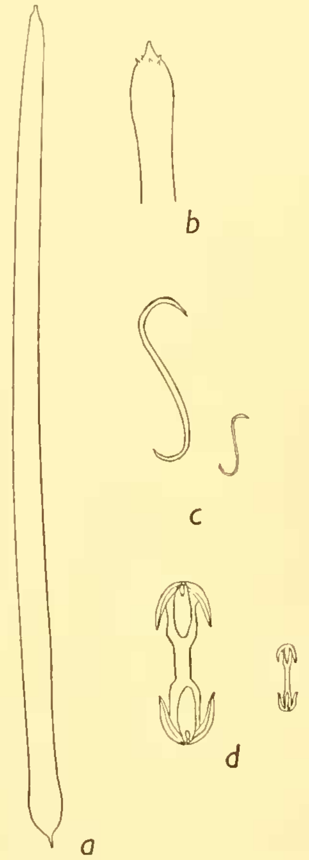

Fig. 26. *Myxilla basimucronata*, sp.n. *a*, style, × 240; *b*, end of typical tornote, × 500; *c*, sigmata, × 500; *d*, chelae, × 500.

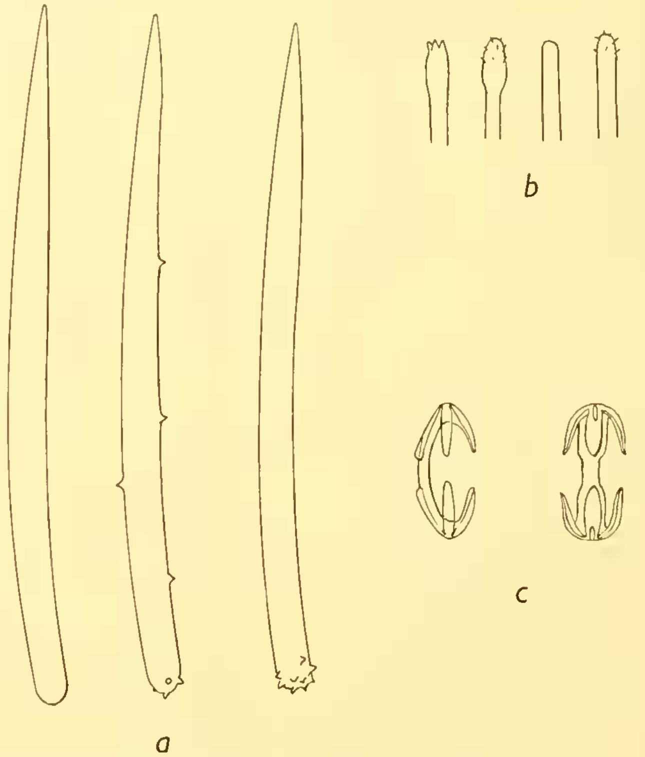

Fig. 27. *Myxilla verrucosa*, sp.n. *a*, styli, and modifications, × 300; *b*, tornota, showing variation in shape of ends, × 300; chelae, × 500.

Myxilla verrucosa, sp.n. (Fig. 27).

Holotype. B.M. 28. 2. 15. 828.

Occurrence. St. WS 243: north-east of Falkland Islands, 144–141 m.

DIAGNOSIS. Sponge small, irregularly massive; surface uneven, verrucose; texture friable; oscules and pores not apparent; colour, in spirit, greenish grey; main skeleton a sub-isodictyal reticulation of styli (often modified to incipient acanthostyli); styli of main skeleton, often bearing a few spines at the base, 0·24 by 0·008–0·018 mm.; dermal tornota, straight, with ends strongylote to subtylote, often minutely spined, 0·16 by 0·007 mm.; chelae, 0·035 mm. chord.

REMARKS. The species may be distinguished from other Antarctic species of *Myxilla* by the absence of sigmata.

Genus **Ectyodoryx**, Lundbeck

Ectyodoryx paupertas, subsp. **nobile** (Ridley and Dendy).

Myxilla nobilis, Ridley and Dendy, 1886, p. 473; *M. nobilis*, var. *patagonica*, *id.*, *loc. cit.*, p. 473; *M. nobilis*, var. *bacillifera*, *id.*, *loc. cit.*, p. 473; *M. nobilis*, *id.*, 1887, p. 140, pl. xxvii, fig. 15, pl. xxx, fig. 2; *M. nobilis*, var. *patagonica*, *id.*, *loc. cit.*, p. 142, pl. xxvii, fig. 13; *M. nobilis*, var. *bacillifera*, *id.*, *loc. cit.*, p. 142, pl. xxvii, fig. 14; *Stylostichon nobile*, var. *patagonicum*, Topsent, 1913, p. 622; *Ectyodoryx nobilis*, Burton, 1929, p. 399.

Occurrence. St. 157: South Georgia, 970 m.; St. 158: South Georgia, 401–411 m.; St. 159: South Georgia, 160 m.; St. WS 79: Falkland Islands, 131–132 m.; St. WS 82: Falkland Islands, 140–144 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 225: Falkland Islands, 162–161 m.; St. WS 239: Falkland Islands, 196–193 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 247: Falkland Islands, 172 m.; St. WS 249: Falkland Islands, 166 m.

REMARKS. The five specimens in the collection show clearly that it is unnecessary to maintain the varieties *patagonica* and *bacillifera*. It is quite evident that the species is variable in so far as the characters of the spicules are concerned. The bases of the styli, for example, may be simply irregularly tuberculate, or may bear a few spines, or they may be crowded with numerous small spines. The tornota may be simply strongylote at each end, or the ends may be slightly inflated, and in both cases a few small spines may or may not be present. An important feature which Ridley and Dendy overlooked is the differentiation of the chelae into two categories, the larger being approximately twice the size of the smaller.

As has already been suggested by Ridley and Dendy (1887, p. 143) and Arnesen (1920, p. 23), I propose to regard *Myxilla nobilis* and *M. paupertas* as forms of one species, the former and its varieties constituting a subspecies distributed throughout the South Atlantic and the immediately adjacent waters, and the latter as a subspecies confined to the North Atlantic. The difference between these two subspecies consists almost entirely in the larger size of the spicules and the slightly more profuse spining in the styli of *Ectyodoryx paupertas*, subsp. *typica*, subsp.n. This subspecies includes, in addition to the forms mentioned by Topsent (1904, p. 168), *Anchinoë nobilis*, Arnesen (1920, p. 22).

DISTRIBUTION. Crozet Islands; Patagonia; off the mouth of the Rio de la Plata; Burdwood Bank.

Ectyodoryx antarctica (Hentschel).

Lissodendoryx antarctica, Hentschel, 1914, p. 102, pl. vii, fig. 9; Burton, 1929, p. 399.

Occurrence. St. 160: Shag Rocks, 177 m.

REMARKS. The present specimen agrees with Hentschel's holotype from the Antarctic in external form, in the shape of the acanthostyli and tornota, and, fairly closely, in the dimensions of the spicules. It differs in the presence of small, echinating acanthostyli, and in the somewhat broader shape of the chelae. The dimensions of its spicules are: large acanthostyli 0·195 by 0·012 mm., echinating acanthostyli 0·09 by 0·006 mm., tornota 0·18 by 0·004 mm., larger chelae 0·021 mm., smaller chelae 0·013 mm., sigmata 0·018–0·025 mm.

As regards the presence of the echinating acanthostyli, there is a specimen from McMurdo Sound, in the British Museum collection, which I had identified as a perfectly typical example of *L. antarctica*. On re-examination, however, this was found to have echinating acanthostyli also, but they were rather rare, and I had overlooked them in my first examination. Possibly therefore the holotype of the species may also possess echinating acanthostyles which were overlooked by Hentschel.

The dimensions of the spicules in the McMurdo Sound sponge are: large acanthostyli 0·24 by 0·004 mm., echinating acanthostyli 0·15 by 0·009 mm., tornota 0·189 by 0·006 mm., larger chelae 0·026 mm., smaller chelae 0·018 mm., sigmata 0·02–0·03 mm. This specimen thus approximates more closely to that described by Hentschel in the dimensions of its spicules.

Assuming that the species rightly belongs to *Ectyodoryx*, we may say that it has considerable resemblance to *Ectyodoryx* (*Myxilla*) *compressa* (Ridley and Dendy) and, to a lesser extent, to *Ectyomyxilla kerguelensis*, Hentschel.

DISTRIBUTION. Wilhelm Land; Victoria Land.

Ectyodoryx frondosa (Ridley and Dendy), var. anacantha, Hentschel.

E. frondosa, var. *anacantha*, Hentschel, 1914, p. 107, pl. iv, fig. 11, pl. vii, fig. 12.

Occurrence. St. 190: Palmer Archipelago, 93–130 m.

DISTRIBUTION. Wilhelm Land.

Ectyodoryx ramilobosa (Topsent).

Dendoryx ramilobosa, Topsent, 1916, p. 167; *id.*, 1917, p. 47, pl. iii, fig. 3, pl. vi, fig. 6; *Ectyodoryx ramilobosa*, Burton, 1929, p. 399.

Occurrence. St. 159: South Georgia, 160 m.

REMARKS. It will probably be found, when a comprehensive survey of the various species of Myxilleae is made, that this species differs generically from the other species of *Ectyodoryx*. The columns of smooth, basally spined styli, echinated abundantly by similar but smaller styli, probably constitute a feature worthy of generic distinction.

Until it is possible to know more concerning the variations in skeletal structure found in this group, however, it would be unwise to insist on such distinction.

Distribution. Victoria Land; Graham Land.

Genus Anchinoë, Gray.

Anchinoë latrunculioides (Ridley and Dendy).

(For synonymy see Burton, 1929, p. 439.)

Occurrence. St. 156: South Georgia, 200–236 m.; St. 159: South Georgia, 160 m.; St. 160: Shag Rocks, 177 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 243: Falkland Islands, 144–141 m.

Distribution. Graham Land; Victoria Land; Wilhelm Land; east coast of South America, up to mouth of Rio de la Plata; South Africa.

Anchinoë areolata (Thiele).

Hymedesmia areolata, Thiele, 1905, p. 452, figs. 23, 68; Kirkpatrick, 1908, p. 24, pl. xxii, fig. 3; Burton, 1931, p. 519, pl. i, fig. 1, text-fig. 3.

Occurrence. St. 152: South Georgia, 245 m.; St. 157: South Georgia, 970 m.; St. 160: Shag Rocks, 177 m.

Distribution. Calbuco; Victoria Land.

Anchinoë leptochela (Hentschel) (Plate LIV, fig. 11).

Hymedesmia leptochela, Hentschel, 1914, p. 115, pl. viii, fig. 2.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 159: South Georgia, 160 m.

Remarks. It is a natural suspicion that many of the species of *Hymedesmia* may eventually prove to be the encrusting, possibly immediate post-fixation stages, of other species of Myxilleae. This, at all events, appears to be the case with *H. leptochela*, Hentschel. The holotype formed a thin encrustation on foreign bodies (Fremdkörper), and had a smooth surface with a low papillate oscule. The skeleton showed the usual *Hymedesmia* structure. The present specimens range from encrusting to massive, always growing on fragments of rock, often incorporating much foreign matter in their substance, and bear a number of papillate oscules. The spicules are almost identical with those of the holotype, but are arranged as in *Anchinoë*.

There is no obvious reason why the skeleton in the immediate post-fixation stage of an *Anchinoë* should not consist of acanthostyli set at right angles to the substratum, with their bases planted thereon, nor why, as growth proceeds, the acanthostyli should not be rearranged to form the ascending fibres, cored by tornota and echinated by acanthostyli, of a typical *Anchinoë*.

Distribution. Wilhelm Land.

Genus Stelodoryx, Topsent.

Genotype. S. procera, Topsent, 1904, p. 174.

REMARKS. The original diagnosis reserves this genus for stipitate "Dendoricinae" with skeleton composed of longitudinal branching fibres, continuous with the axial skeleton of the pedicel, connected at intervals by single spicules placed at right angles to the main fibres. Whether the disposition of the fibres in the genotype constitutes a sound generic character is an open question. Perhaps the more distinctive feature of its spiculation is, however, the presence of polydentate isochelae, and while it is doubtful whether this constitutes a sufficiently good character for generic distinction, a distinction based on this character alone is as good as that at present maintained between *Myxilla* and *Lissodendoryx*, genera closely allied to *Stelodoryx*. For the present, therefore, I propose to adopt the genus *Stelodoryx* as a convenient arbitrary division of those Myxilleae in which the distinctive feature is the presence of polydentate isochelae.

Other species which fall naturally into *Stelodoryx*, as now understood, are *Dendoryx dentata*, Topsent (*loc. cit.*, p. 172), *Myxilla diversiancorata*, Lundbeck (1905, p. 150), *M. pluridentata*, Lundbeck (*loc. cit.*, p. 154), and *S. discoveryi*, sp.n.

Stelodoryx pluridentata (Lundbeck).

Myxilla pluridentata, Lundbeck, 1905, p. 150, pl. v, fig. 3, pl. xv, fig. 2 *a–i*.

Occurrence. St. WS 243: Falkland Islands, 144–141 m.

REMARKS. Except that the spicules are slightly smaller it is impossible to find any difference between the present specimen and the type of *Myxilla pluridentata*. The chelae, for example, seldom exceed 0·065 mm. chord, as against 0·071–0·097 mm., the tornota vary from 0·24 to 0·28 mm., as against 0·226–0·32 mm., although the ends show the same variability in each case, and the styli, although much the same size, are sometimes slightly tylote in the present specimen. Externally, the two specimens agree closely except that the type is much smaller, the present specimen measuring 4 cm. by 4 cm. by 5 cm. high.

The specimen from Falkland Islands may be conspecific with the Arctic specimen (i.e. the type), or the two may represent convergent species which are indistinguishable. At all events, the wide geographical separation is a point of interest.

DISTRIBUTION. Iceland.

Stelodoryx discoveryi, sp.n. (Fig. 28).

Holotype. B.M. 28. 2. 15. 426.

Occurrence. St. WS 88: Falkland Islands, 96–127 m.; St. WS 90: Falkland Islands, 82–81 m.

DIAGNOSIS. Sponge irregularly massive; surface even and smooth to the naked eye, very minutely hispid when viewed with a hand lens; oscules 1–2 mm. in diameter, arranged in linear series on ridge-like portions of surface, or at apices of lobular outgrowths; pores apparently arranged generally over surface; texture compressible but elastic; colour, in spirit, very dark brown; main skeleton an isodictyal reticulation of smooth styli forming multispicular primary fibres, about six spicules thick, running vertically to surface, connected at intervals by irregularly arranged single spicules; dermal skeleton composed of irregular brushes of tornota arranged more or less at right angles to surface; megascleres smooth, often slightly curved, styli, 0·225 by 0·006 mm., and straight tornota, with ends mucronate, strongylote or truncate and sparingly spined, occasionally asymmetrical, 0·165 by 0·005 mm.; microscleres, polydentate isochelae, with usually five teeth, 0·035–0·045 mm. long.

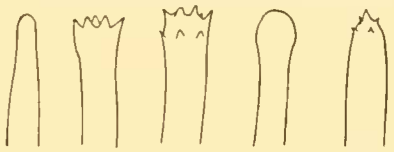

Fig. 28. *Stelodoryx discovereyi*, sp.n. Examples of variation in ends of tornota, × 1000.

REMARKS. The present species differs from the genotype in the absence of a pedicel and the smaller size of the styli, from *S. dentata* in having smooth styli, instead of acanthostyli, from *S. diversiancorata* in having only one sort of isochela, and from *S. pluridentata*, which it most nearly resembles, in the smaller size of the isochelae.

Genus Kirkpatrickia, Topsent.

Kirkpatrickia variolosa (Kirkpatrick).

Tedania variolosa, Kirkpatrick, 1907, p. 279; *id.*, 1908, p. 32, pl. xxi, fig. 1, pl. xxv, fig. 1; *Kirkpatrickia variolosa*, Topsent, 1912, p. 3.

Occurrence. St. 149: South Georgia, 200–234 m.; St. 175: South Shetlands, 200 m.; St. WS 27: South Georgia, 106–109 m.

REMARKS. The specimens in life were coloured bright crimson or deep magenta red.

DISTRIBUTION. Victoria Land.

Kirkpatrickia coulmani (Kirkpatrick) (Plate LV, fig. 5).

Tedania coulmani, Kirkpatrick, 1907, p. 280; *id.*, 1908, p. 33, pl. xxi, fig. 2, pl. xxv, fig. 2; *Kirkpatrickia coulmani*, Topsent, 1912, p. 3.

Occurrence. St. 42: South Georgia, 120–204 m.

REMARKS. The present specimen agrees closely with the holotype except that the styles are entirely smooth.

DISTRIBUTION. Victoria Land.

Genus Acheliderma, Topsent.

The genus belongs obviously to the Myxilleae. Owing to Hallmann's (1920, p. 768) diagnosis of *Allocia*, there appears, at first sight, to be some similarity between this genus and *Acheliderma*. This is due to his having suggested the possibility of the occurrence of toxa in forms, as yet undescribed, allied to the genotype of *Allocia*, *Spanioplon cheliferum*, Hentschel. It was probably the inclusion of the phrase "perhaps sometimes accompanied by toxa," in his diagnosis, that caused Hallmann to overlook the obvious affinity of *S. cheliferum* with *Ectyodoryx*, which Hentschel (1911, p. 363) himself had suggested.

Acheliderma topsenti, sp.n. (Plate LIV, figs. 7–9).

Holotype. B.M. 28. 2. 15. 393.

Occurrence. St. 160: near Shag Rocks, 177 m.

DIAGNOSIS. Sponge small, flabello-digitate; surface uneven, hispid; oscules and pores not apparent; texture tough; colour, in spirit, yellow; skeleton a sub-isodictyal reticulation of styli, with main fibres semi-plumose, echinated by acanthostyles; a confused layer of tornota occurs in dermis and tornota are found sparingly associated with main skeleton; main skeleton contains a small amount of spongin; microscleres, isochelae palmatae and toxa; styli of main skeleton, long, smooth, but bearing a few feeble spines at base, slightly curved, 0·42 by 0·009 mm.; acanthostyli, slightly curved, regularly and sparingly spined throughout length, 0·15 by 0·007 mm.; tornota, smooth, straight, truncate, bearing a crown of a few spines at each end, 0·225 by 0·003 mm.; isochelae palmatae, 0·021 mm. long; toxa long, smooth, ends not spined but ending in a sharp point, 0·06–0·48 by 0·007 mm.

REMARKS. The present species differs from the genotype, *A. lemniscata*, Topsent, from the North Atlantic, in the longer toxa and in possessing isochelae instead of raphides. Otherwise the two species agree very closely in spiculation.

Genus **Inflatella**, Schmidt

Inflatella belli (Kirkpatrick).

(For synonymy see Burton, 1929, p. 439.)

Occurrence. St. WS 83: Falkland Islands, 137–129 m.; St. WS 248: Falkland Islands, 210–242 m.

DISTRIBUTION. Victoria Land; Wilhelm Land; New Zealand.

Section *PLOCAMIEAE*

Genus **Plocamia**, Schmidt

Plocamia gaussiana, Hentschel.

Plocamia gaussiana, Hentschel, 1914, p. 120, pl. viii, fig. 5; Burton, 1929, p. 435.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 148: South Georgia, 132–148 m.; St. 159: South Georgia, 160 m.; St. 160: Shag Rocks, 177 m.; St. 175: South Shetlands, 200 m.; St. WS 42: South Georgia, 198 m.

REMARKS. Except that the chelae seldom exceed 0·03 mm. length, and that trichodragmata, measuring 0·03 × 0·006 mm., are present in small quantities, this specimen is quite typical.

DISTRIBUTION. Wilhelm Land; Victoria Land.

Section *CLATHRIEAE*

Genus Clathria, Schmidt

Clathria papillosa, Thiele.

C. papillosa, Thiele, 1905, p. 449, fig. 66.

Occurrence. St. WS 81: Falkland Islands, 81–82 m.; St. WS 83: Falkland Islands, 129–137 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 95: Falkland Islands, 108–109 m.

REMARKS. Apart from the arrangement of the skeleton, all six specimens are typical, except for negligible differences in the sizes of the spicules in two of them. The skeleton is a regular network of triangular mesh, the sides of the meshes being one spicule length only and composed of three to six spicules, with the acanthostyli confined to the nodes of the network. In two of the specimens a slight departure from this arrangement is found in that occasional fibres, formed of bundles of megascleres, are seen running perpendicularly to the surface. The arrangement of the skeleton is therefore not only more variable than is usual in the genus *Clathria* but is not very typical of that genus.

DISTRIBUTION. Calbuco.

Clathria toxipraedita, Topsent.

C. toxipraedita, Topsent, 1913, p. 620, pl. v, fig. 4, pl. vi, fig. 12.

Occurrence. St. 144: South Georgia, 155–178 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 33: South Georgia, 130 m.

REMARKS. The larger chelae, described by Topsent, are absent from this specimen, which agrees with the holotype in all other respects.

DISTRIBUTION. Burdwood Bank.

Clathria lipochela, sp.n. (Plate LV, figs. 6–7; Fig. 29).

Holotype. B.M. 28. 2. 15. 352.

Occurrence. St. 51: Falkland Islands, 105–115 m.

DIAGNOSIS. Sponge pedunculate, irregularly flabellate; surface uneven, porose; inhalant and exhalant openings not distinguishable as such; skeleton an irregular network of quadrate meshes in which stout primary fibres may be recognized running vertically to surface; fibres containing much spongin, cored by principal megascleres and echinated by acanthostyli; microscleres absent; principal megascleres smooth styli, occasionally sparingly spined near base, 0·21 by 0·009 mm.; echinating acanthostyli somewhat variable in size, with spines evenly distributed throughout their length and slightly more numerous at base, 0·09 by 0·006 mm.; auxiliary spicules subtylostyli, smooth, straight, arranged in bundles at right angles to dermis or scattered singly among meshes of main skeleton, 0·15 by 0·003 mm.

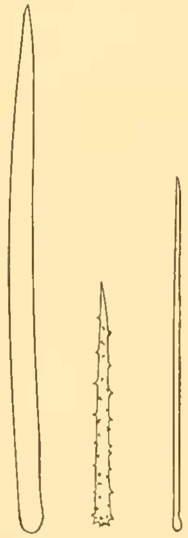

Fig. 29. *Clathria lipochela*, sp.n. Spicules, × 300.

REMARKS. There are few species of *Clathria* in which microscleres are entirely absent, and the present species is distinguished from all such hitherto described by the almost complete absence of spines on the principal megascleres. In appearance it resembles *Raspaxilla phakellina*, Topsent, but is distinguished from it by the absence of an axial skeleton and plumose columns of spicules, as well as by the absence of the peculiar acanthostyli in which the basal half is smooth.

Genus Rhaphidophlus, Ehlers

Rhaphidophlus paucispiculus, sp.n. (Plate LVI, fig. 1; Fig. 30).

Holotype. B.M. 28. 2. 15. 243.

Occurrence. St. 160: Shag Rocks, 177 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 109: Falkland Islands, 145 m.

DIAGNOSIS. Sponge massively flabellate, with tendency to give off digitate outgrowths, to massively branching; surface uneven and minutely conulose; oscules and pores not apparent; colour, in spirit, light brown; main skeleton composed of irregular bundles of styli running perpendicularly to surface or forming a confused reticulation of spicules lying at all angles to each other; smaller styli, differing from styli of main skeleton only in size, are scattered between fibres of main skeleton and also form a dense dermal skeleton; dermal skeleton consisting of a tangential layer of smaller styli with brushes of similar spicules situated immediately beneath and lying at right angles to it; styli of main skeleton smooth, slightly curved, 0·54–0·71 by 0·024–0·027 mm.; auxiliary styli, in dermal skeleton and scattered between meshes of main skeleton, 0·24–0·31 by 0·006–0·009 mm.

REMARKS. The species appears to be a typical *Rhaphidophlus*, but differs from all other species of that genus in the absence of echinating acanthostyli and microscleres. There appears to be little difference between the styli of the dermal skeleton and the auxiliary styli scattered between the meshes of the main skeleton, and for this reason they have been treated in the diagnosis as one form. There may possibly be a slight difference in size, but if so it is hard to appreciate this difference. Further, it is worth noting that intermediates between the larger and smaller styli also appear to be present, but whether they are very young forms of the larger styli or half-grown forms of the smaller spicules is again difficult to determine.

Fig. 30. *Rhaphidophlus paucispiculus*, sp.n. Spicules from *a*, main skeleton; *b*, dermis. × 200.

Genus Protoclathria, gen.n.

DIAGNOSIS. Clathrieae with skeleton composed of tylostyli and acanthostrongyla, arranged in a triangular network; there is no dermal skeleton and microscleres are absent.

REMARKS. The genus, with its extremely simple skeleton, is not easy to classify. The presence of acanthostrongyla suggests at once an affinity with the Ectyoninae, and, for the time being at all events, I propose to regard it as a primitive Ectyonine, preferably as one of the Clathrieae.

Protoclathria simplicissima, sp.n. (Plate LVI, fig. 2; Fig. 31).

Holotype. B.M. 28. 2. 15. 369.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DIAGNOSIS. Sponge pyriform or massive, irregular; surface even, hispid; oscules and pores not apparent; texture firm but friable; colour, in spirit, dark grey; skeleton sub-isodictyal, consisting of a densely knit triangular mesh, usually multispicular but often unispicular in patches; no special dermal skeleton; little or no spongin; microscleres of two kinds only, tylostyli and acanthostrongyla; tylostyli, forming bulk of skeleton, usually curved or even strongly angulated at or near the centre, often reduced to styli or, more rarely, to oxea, 0·26 by 0·015 mm.; acanthostrongyla, of very rare occurrence, not echinating the skeleton but occupying same relative position as tylostyli, straight, 0·18 by 0·012 mm.

REMARKS. In deciding the systematic position of this species, the difficulty is increased by the distribution of the acanthostrongyla. In the holotype they are numerous; in the first co-type they are rare; and in the third specimen they appear to be absent altogether. In the last therefore the skeleton consists only of tylostyli, and the sponge might well have been placed among the Suberitidae had it not been possible to make a comparison with the first two specimens.

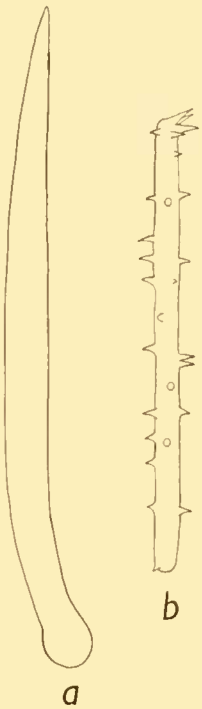

Fig. 31. *Protoclathria simplicissima*, sp.n. *a*, substylostyle; *b*, acanthostyle. × 320.

Genus **Ophlitaspongia**, Bowerbank

Ophlitaspongia membranacea, Thiele.

O. membranacea, Thiele, 1905, p. 450, figs. 67, 105.

Occurrence. St. 152: South Georgia, 245 m.

REMARKS. The two specimens show a marked resemblance to the holotype of *O. membranacea*, Thiele, in the shape and disposition of the spicules, but differ in the external form and in the dimensions of the spicules. The first specimen consists of an erect digitate lobe bearing a small lateral branch, while the second is massive with incipient digitate processes at the top. Both have, however, a strongly hirsute surface as in the holotype. In the second specimen the smaller megascleres measure 0·5 by 0·024 mm. and the larger 1·2 by 0·036 mm. The auxiliary subtylostyli ("dünnen Style" of Thiele, *loc. cit.*, p. 451) measure 0·3 by 0·003 mm. In the first specimen, the dimensions of these spicules are much the same except that the larger megascleres often attain a length of

1·5 mm. The chelae are rare in the second specimen and do not exceed 0·006 mm. in length, and are apparently absent in the first. The toxa in both range from 0·7 to 0·07 mm. long, the larger being 0·006 mm. thick and strongly spined at the ends.

In spite of the differences from the holotype, I have little hesitation in identifying these two specimens with Thiele's species. The differences in the external form are comparatively unimportant, and the differences in the measurements of the spicules are no greater than those found in the various specimens assigned to *O. thielei* (see below), a closely related species. Regarding the toxa, it is of interest to note that in *O. thielei* the large toxa are often rare and difficult to find, and it is possible that large toxa are present in the holotype of *O. membranacea* but in such small quantities as to be readily overlooked. Even if they are actually absent, in view of the observations made on *O. thielei* I should still feel justified in identifying the two present specimens with Thiele's species.

Table showing dimensions of spicules in O. membranacea.

Station No.	Styli	Subtylostyli	Toxa	Chelae
42	0·48 × 0·028	0·30 × 0·006	0·1–0·42, scarce, especially the larger forms	0·012
42	0·45 × 0·024	0·30 × 0·006	0·03–0·22, rare, especially the larger forms	0·01
148	0·38 × 0·013	0·23 × 0·006	0·12–0·3, small toxa rare	0·012
156	0·36 × 0·015	0·24 × 0·006	0·35–0·24, all forms rare, but more particularly the larger	0·015
WS 25	0·36 × 0·021	0·30 × 0·006	0·065–0·48, abundant	0·009
WS 25	0·51 × 0·018	0·32 × 0·006	0·09 × 0·54, small forms rare	0·013

The measurements of the spicules, which are averages, are given in mm.

DISTRIBUTION. Juan Fernandez.

Ophlitaspongia thielei, sp.n. (Plate LV, fig. 8; Fig. 32).

Holotype. B.M. 28. 2. 15. 219.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 148: South Georgia, 132–148 m.; St. 156: South Georgia, 200–236 m.; St. WS 25: South Georgia, 18–27 m.

DIAGNOSIS. Sponge massive; surface hispid and produced into papillate processes or meandrine ridges which may be so strongly developed as to give a clathrate appearance, or may be reduced to a feeble furrowing; pores apparently small and simple, and scattered evenly throughout dermis; oscules circular, 1–2 mm. in diameter, with delicate membranous velum, leading into cavernous sub-dermal crypts; often there is a single deep cloaca with a number of smaller oscules scattered over surface generally; texture firm and slightly compressible; skeleton a dense or feebly knit reticulation of styli, often showing strongly marked primary fibres which project slightly beyond ectosome as surface brushes; auxiliary spicules, found chiefly associated with dermal brushes, slender subtylostyli; microscleres toxa and chelae; styli of main skeleton slightly curved, 0·36–0·51 by 0·013–0·028 mm.; auxiliary subtylostyli, straight with crown of spines at basal end and with distal end pointed or, occasionally, blunted and spined, 0·23–0·32 by 0·006 mm.; toxa of varying size, smaller forms slender and strongly bent, larger stout and strongly spined at ends, 0·03–0·54 mm. long; isochelae palmatae, 0·009–0·015 mm. chord.

Fig. 32. *Ophlitaspongia thielei*, sp.n. *a*, style of main skeleton; *b*, auxiliary subtylostyle; *c*, *c′*, toxa, showing extremes in size; *d*, chela. All × 200.

REMARKS. The species is characterized by its external form and by the character of the microscleres. In many respects it resembles *Artemisina dianae*, Topsent, and forms, in fact, a connecting link between the two genera *Ophlitaspongia* and *Artemisina*, so that it becomes a matter of doubt whether these two genera can be maintained.

Genus Artemisina, Vosmaer

Artemisina apollinis (Ridley and Dendy).

(For synonymy see Burton, 1929, p. 431.)

Occurrence. St. 42: South Georgia, 120–204 m.

DISTRIBUTION. Wilhelm Land; Victoria Land; Graham Land; Kerguelen; North Atlantic.

Artemisina plumosa, Hentschel.

A. plumosa, Hentschel, 1914, p. 70, pl. iv, fig. 5, pl. vi, fig. 1; *A. plumosa*, var. *lipochela*, *id.*, *loc. cit.*, p. 72; *A. strongyla*, *id.*, *loc. cit.*, p. 72, pl. vi, fig. 2.

Occurrence. St. WS 109: Falkland Islands, 145 m.

REMARKS. An irregularly branching and anastomosing specimen having the general external characters of *A. plumosa*, var. *lipochela*, and a similar skeleton except that microscleres appear to be quite absent.

DISTRIBUTION. Wilhelm Land.

Genus Dictyociona, Topsent

Dictyociona discreta (Thiele) (Plate LVI, figs. 3–4).

Microciona discreta, Thiele, 1905, p. 447, fig. 65; *Dictyociona discreta*, Topsent, 1913, p. 618, pl. iii, fig. 5.

Occurrence. St. WS 79: Falkland Islands, 131–132 m.; St. WS 95: Falkland Islands, 108–109 m.; St. WS 243: Falkland Islands, 144–141 m.

REMARKS. On examining a piece of the holotype, I find that the smooth parts of the acanthostyli are not so well defined as Thiele's drawings would suggest. Usually spines are present on those parts, but they may be few and only feebly developed.

DISTRIBUTION. Calbuco; Gough Island.

Dictyociona terrae-novae (Dendy).

Clathria terrae-novae, Dendy, 1924, p. 353, pl. xii, fig. 5, pl. xiv, figs. 9–13.

Occurrence. St. 157: South Georgia, 970 m.

REMARKS. This species shows a strong likeness to *Clathria toxipraedita*, Topsent, and *C. mortenseni*, Brøndsted, and it is possible that all three may prove to be not only congeneric but also conspecific.

In the present specimen, the most noteworthy feature is the variability in the main megascleres, which show all stages between the large smooth styli and the acanthostyli. The main skeleton consists of columns of styli running towards the surface and connected at intervals by short fibres containing a few spicules only. The whole is echinated with acanthostyli. Auxiliary spicules in the form of slender subtylostyli are also present. The main megascleres are smooth styli in which the base may be entirely tuberculate or bear only a few tuberculations; or the spicule may be sparsely tuberculate throughout. The apex also may be simple, or spined, or truncate and tuberculate. The dimensions are 0·42 by 0·015 mm. The echinating acanthostyli are entirely spined, with the spines particularly concentrated at the base, and measure 0·18–0·27 by 0·003 mm. The auxiliary subtylostyli are smooth and straight, with a crown of inconspicuous spines at the base, and measure 0·105 by 0·008 mm. The microscleres are palmate isochelae, 0·011 mm. chord, and toxa, with spiny ends, 0·065–0·09 mm. long.

DISTRIBUTION. New Zealand.

Genus Axociella, Hallmann

Axociella nidificata (Kirkpatrick).

Ophlitaspongia nidificata, Kirkpatrick, 1907, p. 274; *id.*, 1908, p. 25, pl. xxii, fig. 6; pl. xxvi, fig. 5; *Axociella nidificata*, Burton, 1929, p. 433.

Occurrence. St. 148: South Georgia, 132–148 m.; St. 187: Palmer Archipelago, 259 m.; St. 190: Palmer Archipelago, 93–130 m.

DISTRIBUTION. Victoria Land.

Axociella flabellata (Topsent).

Ophlitaspongia flabellata, Topsent, 1916, p. 167; *id.*, 1917, p. 41, pl. i, fig. 4, pl. vi, fig. 2; *Axociella flabellata*, Burton, 1929, p. 433.

Occurrence. St. 140: South Georgia, 122–136 m.; St. 149: South Georgia, 200–234 m.

DISTRIBUTION. Graham Land; Victoria Land.

Genus Pseudanchinoë, Burton

Pseudanchinoë toxifera (Topsent).

Stylostichon toxiferum, Topsent, 1913, p. 621, pl. iv, fig. 7, pl. vi, fig. 14; *Anchinoë toxiferum*, subsp. *antarctica*, *id.*, 1917, p. 43, pl. iv, fig. 5, pl. vi, fig. 5; *Pseudanchinoë toxiferum*, Burton, 1929, p. 434.

Occurrence. St. 160: Shag Rocks, 177 m.; St. WS 237: Falkland Islands, 150–256 m.

DISTRIBUTION. Graham Land; Victoria Land; Gough Island.

Genus Eurypon, Gray

Eurypon miniaceum, Thiele.

E. miniaceum, Thiele, 1905, p. 446, fig. 64; *Raspailia irregularis*, Hentschel, 1914, p. 121, pl. viii, fig. 6.

Occurrence. St. 91: False Bay, South Africa, 35 m.; St. 156: South Georgia, 200–236 m.; St. 190: Palmer Archipelago, 93–130 m.

REMARKS. In external form, the two Antarctic specimens in the present collection are practically identical and are similar to *Raspailia irregularis*; but so far as the spiculation is concerned the first is almost indistinguishable from *R. irregularis* and the second from *Eurypon miniaceum.* The chief difference in spiculation between these two specimens is that the "eigenthümliche Acanthostyle" is absent in the one and present in the other, although when present this spicule is not quite typical, since the base is tylote or subtylostylote instead of stylote. Since the main difference between *Raspailia irregularis* and *Eurypon miniaceum* consists in the absence and presence respectively of this curious spicule, it seems almost certain in the light of the present observations that the two are identical. It appears probable that, in addition to its being of variable occurrence, the spicule is variable in form.

It is most surprising that a specimen of this species should have been found at False Bay, South Africa. This specimen is sub-spherical, with no visible point of attachment, and the surface is uneven, conulose and minutely hispid. The oscules and pores are probably situated in certain deep but irregular depressions found on the surface of the sponge. The spiculation appears to be typical except that all spicules are slightly smaller than those of the holotype and the "eigenthümliche Acanthostyle" is not to be found.

DISTRIBUTION. Calbuco, Chile.

Genus Stylotellopsis, Thiele

Stylotellopsis amabilis, Thiele.

S. amabilis, Thiele, 1905, p. 456, fig. 72.

Occurrence. St. WS 27: South Georgia, 106–109 m.; St. WS 83: Falkland Islands, 137–129 m.

DISTRIBUTION. Punta Arenas.

Genus Raspaxilla, Topsent

Raspaxilla phakellina, Topsent.

R. phakellina, Topsent, 1913, p. 617, pl. i, fig. 4, pl. vi, fig. 15.

Occurrence. St. WS 81: Falkland Islands, 81–82 m.; St. WS 84: Falkland Islands, 75–74 m.

DISTRIBUTION. Burdwood Bank.

Section *HYMEDESMIEAE*

Genus Hymedesmia, Bowerbank

Hymedesmia irritans, Thiele.

Desmacidon ceratosa, Thiele, 1905, p. 435, fig. 56; *Hymedesmia irritans*, *id.*, *loc. cit.*, p. 455, fig. 71. *Nec Amphilectus ceratosus*, Ridley and Dendy.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. The present specimen has the form of a thin crust on a piece of coral. Its structure is quite typical except that the sigmata and forceps are extremely rare. Also, it may be noted that the acanthostyli are confined to those tissues immediately in contact with the coral.

From the observations made on the Discovery example of this species, it seems probable that *Desmacidon ceratosa* (Ridley and Dendy), Thiele, belongs to the same species. Both are encrusting, both possess amphitylota and chelae of the same size and shape. The differences between them rest in the absence of acanthostyli, sigmata and forceps in *D. ceratosa*. Since it has now been shown that these three forms of spicules may be either very rare or very inconspicuous, it is probable that more careful examination may reveal their presence in those forms identified by Thiele as *D. ceratosa*.

Hymedesmia, cf. laevis, Thiele.

H. laevis, Thiele, 1905, p. 453, fig. 69.

Occurrence. St. 58: Falkland Islands, 1–2 m.

REMARKS. The specimen agrees well with the holotype of *Hymedesmia laevis*, Thiele, except that the tornota are mucronate at each end instead of simply strongylote.

DISTRIBUTION. Calbuco, Chile.

Hymedesmia simillima, var. antarctica, Hentschel.

H. simillima, var. *antarctica*, Hentschel, 1914, p. 112.

Occurrence. St. WS 33: South Georgia, 130 m.; St. WS 225: Falkland Islands, 162–161 m.

Remarks. There is a slight difference from the holotype in the curvature of the shafts of the chelae.

Distribution. Wilhelm Land.

Hymedesmia longurioides, sp.n. (Fig. 33).

Holotype. B.M. 28. 2. 15. 468.

Occurrence. St. 160: Shag Rocks, 177 m.

Diagnosis. Sponge thinly encrusting; surface smooth, even; oscules in form of low chimney-like chones; pores not apparent; colour, in spirit, white; main skeleton composed of acanthostyli of two sizes; dermal skeleton an irregular tangential layer of tornota; large acanthostyli almost entirely spined, with swollen base, 0·35 by 0·016 mm.; small acanthostyli entirely spined, 0·105 by 0·008 mm.; dermal tornota smooth, straight, sharply but abruptly pointed at each end, 0·32 by 0·007 mm.

Remarks. The acanthostyli are apparently divided into two distinct categories with occasional intermediates. The surface of the sponge bears a number of low chimney-like chones, but whether these are poral or oscular, or both, it is difficult to say.

The species bears a resemblance to *H. longurius*, Lundbeck, but differs in the characters of the tornota.

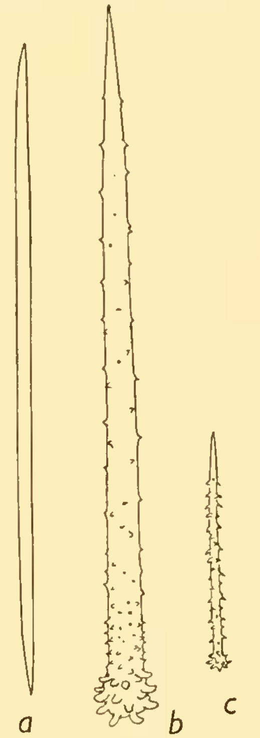

Fig. 33. *Hymedesmia longurioides*, sp.n. *a*, dermal tornote; *b* and *c*, acanthostyli. × 300.

Section *CRELLEAE*

Genus Crella, Gray

Crella crassa (Hentschel).

Grayella crassa, Hentschel, 1914, p. 95, pl. vii, fig. 3.

Occurrence. St. 175: South Shetlands, 200 m.

Distribution. Wilhelm Land.

Genus Crellina, Hentschel

Crellina tubifex, Hentschel.

C. tubifex, Hentschel, 1914, p. 110, pl. iv, fig. 12, pl. vii, fig. 14.

Occurrence. St. 175: South Shetlands, 200 m.

Distribution. Wilhelm Land.

Family AXINELLIDAE

Genus Hymeniacidon, Bowerbank

Genotype. Hymeniacidon caruncula, Bowerbank, 1858, p. 286 (*fide* Thiele, 1905, p. 421).

Diagnosis. Axinellidae possessing styli only; main skeleton a confused reticulation; with special dermal skeleton in form of tangential layer of irregularly scattered spicules.

Hymeniacidon caruncula, Bowerbank, Autt.

Occurrence. On the beach, Saldanha Bay.

Remarks. The two specimens appear to be identical with those described by Stephens (1915, p. 438) from the same locality.

Distribution. From the Arctic down the eastern shores of the Atlantic to Saldanha Bay.

Hymeniacidon sanguinea (Grant), Autt.

Occurrence. St. 271: Elephant Bay, Angola, 0–5 m.

Remarks. An orange-coloured sponge encrusting clumps of *Ostrea*.

Distribution. North Atlantic and Arctic Oceans.

Hymeniacidon fernandezi, Thiele.

H. fernandezi, Thiele, 1905, p. 422; Topsent, 1913, p. 615, pl. iii, fig. 6.

Occurrence. St. 53: Falkland Islands, 0–2 m.; St. 145: South Georgia, 26–35 m.; St. 160: Shag Rocks, 177 m.; St. WS 27: South Georgia, 106–109 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 85: Falkland Islands, 79 m.

Remarks. One specimen is growing amidst the branches of an alga, in company with *Iophon unicornis*. In external appearance it resembles the specimen figured by Topsent (*loc. cit.*), while its skeleton is very like that of the holotype, with which I have been able to make a comparison. The styli measure 0·3 by 0·008 mm.

A second specimen is massive and low-lying, encrusting fragments of shells. The spicules measure 0·2 by 0·005 mm. and the sponge resembles very closely in appearance and texture the specimens recorded above under *H. caruncula*, Bowerbank.

There is little doubt, as Topsent has suggested, that the present species has a close affinity with *H. caruncula*, and it is difficult to see how a distinction between the two species can be made except on the grounds of small differences in the size of their respective spicules. Until the variations in *H. caruncula* have been carefully studied, however, it is better to regard the two species as distinct.

Distribution. Juan Fernandez; Falkland Islands.

Hymeniacidon torquata, Topsent.

H. torquata, Topsent, 1916, p. 166; *id.*, 1917, p. 40.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

Remarks. The single specimen is doubtfully assigned to this species.

Distribution. Petermann Island.

Hymeniacidon dubia, sp.n. (Plate LVI, fig. 9; Fig. 34).

Holotype. B.M. 28. 2. 15. 364.

Occurrence. St. WS 83: Falkland Islands, 137–129 m.

DIAGNOSIS. Sponge massive, clathrate; surface minutely hispid and beset with warty protuberances, as though sponge body were composed of numerous thickly-set branches which had anastomosed, leaving stunted ends exposed at surface; oscules not seen; skeleton a confused reticulation of, usually, single spicules; spicules styli, usually thickest at centre and tapering away at each end, 0·48 by 0·11 mm.

REMARKS. The species approximates more closely to *Axinella verrucosa*, Brøndsted, from New Zealand, than to any other species of Axinellidae. It differs from that species in the absence of spicule fibres and of strongyla and in the size of the spicules. The most important feature they have in common is that the styli are thickest at the centre and thence taper gently towards each end, in the manner of the megascleres of *Polymastia*, instead of having the same diameter throughout their length except at the distal end where they taper to a point, as in the typical Axinellid style. In all respects, however, the present species is a typical *Hymeniacidon*. Further, many of the spicules, smaller than the rest and probably only young forms, are regularly stylote, as in the typical Axinellid.

Fig. 34. *Hymeniacidon dubia*, sp.n. Style, × 200.

Genus **Thieleia**, gen.n.

Genotype. Hymeniacidon rubiginosa, Thiele.

DIAGNOSIS. Main skeleton composed of delicate strands of spicules running vertically to the surface and connected to each other by irregularly arranged masses of single spicules. At the surface, the ends of the strands diverge to form dense brushes of spicules the apices of which project slightly beyond the dermis. There is no special dermal skeleton, unless the dense brushes formed from the ends of the strands of the main skeleton can be regarded as such.

Thieleia rubiginosa (Thiele).

Hymeniacidon rubiginosa, Thiele, 1905, p. 421, fig. 44.

Occurrence. St. 157: South Georgia, 970 m.

DISTRIBUTION. Iquique.

Analysis of the species of Hymeniacidon *of the South Atlantic-Antarctic region*

Of the numerous species hitherto assigned to the genus *Hymeniacidon*, the majority have proved to be synonyms of *H. caruncula* and *H. sanguinea*, or are now known to belong to other genera. Of the remainder, five are recorded from the South Atlantic-Antarctic region.

H. fernandezi, Thiele, 1905, p. 422. Skeleton arranged as in *H. caruncula*.

H. kerguelensis, Hentschel, 1914, p. 123. Skeleton as in *H. caruncula*.

H. torquata, Topsent, 1917, p. 40. I have not seen a specimen of this species, but by comparing Topsent's description with a portion of the holotype of *H. rubiginosa* there appears to be little doubt that the two species are synonymous. According to its author, the spicules of *H. torquata* are "généralement marqués près de leur base d'un léger bourrelet qui la renfle en base de subtylostyle". The same may be said of *H. rubiginosa*.

H. centrotyla, Hentschel, 1914, p. 125. Skeleton as in *Thieleia rubiginosa* (Thiele).

Genus **Axinella**, Schmidt

Axinella crinita, Thiele.

A. crinita, Thiele, 1905, p. 424, fig. 46.

Occurrence. St. WS 82: Falkland Islands, 140–144 m.

DISTRIBUTION. Calbuco, Chile.

Genus **Pseudaxinella**, Thiele

Pseudaxinella egregia (Ridley).

Phakellia egregia, Ridley, 1881, p. 114, pl. x, fig. 6; *Pseudaxinella egregia*, Thiele, 1905, p. 426, fig. 47.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. In his original preparations I find all the spicules Ridley has described with the exception of the "Setaceous acuate". This I have been quite unable to find. It must be assumed, therefore, that either this particular spicule is extremely rare or that Ridley himself has made some mistake about it. The longest spicules in his preparations do not exceed 0·9 mm. Thiele also remarks that the spicules over 0·8 mm. in length were very rare in his Calbuco sponge.

The present specimens agree closely with the holotype except that the spicules are more robust and the oxea much more numerous. One specimen is sub-cylindrical, presumably erect, the other massive, almost pyriform.

DISTRIBUTION. Calbuco and Sandy Point (South America).

Genus **Homaxinella**, Topsent

Homaxinella supratumescens (Topsent).

(For synonymy see Burton, 1929, p. 443.)

Occurrence. St. 148: South Georgia, 132–148 m.; St. WS 62: South Georgia, 15–45 m.; St. MS 14: South Georgia, 190–110 m.

REMARKS. The first specimen is quite typical in all respects. So also is the second, except that it is attached at the base to the spine of an Echinoderm. The third specimen consists of a group of three apparently very young specimens, which support Topsent's (1908, p. 33) view that the species is characterized by rapid growth. The smallest is 100 mm. high and 1·5 mm. thick, the largest 180 mm. high and 2 mm. thick. The body of the sponge in each case can only be described as incipient, consisting of an inconspicuous feathery structure occupying the upper third of the stalk, resembling in appearance that of *Asbestopluma pennatula*, Schmidt (see Lundbeck, 1905, pl. ii, fig. 1). The stalk is evidently very quick growing, for it reaches a considerable height before the body even begins to take form, a state of affairs very similar to that in *Stylocordyla borealis* (Lovén) (see Burton, 1928, p. 68).

DISTRIBUTION. Graham Land; Victoria Land; Wilhelm Land.

Genus **Rhizaxinella**, Keller

Rhizaxinella australiensis, Hentschel.

R. australiensis, Hentschel, 1909, p. 397, pl. xxii, figs. 4, 5; text-figs. 27, 28; Burton, 1929, p. 443.

Occurrence. St. 158: South Georgia, 401–411 m.; St. 175: South Shetlands, 200 m.; St. 190: Palmer Archipelago, 93–130 m.; St. WS 225: Falkland Islands, 162–161 m.

DISTRIBUTION. Australia; Victoria Land.

Genus **Stylohalina**, Kirk

Stylohalina hirta (Topsent) (Fig. 35).

Amorphina hirta, Topsent, 1889, p. 44, fig. 9 A.

Occurrence. St. 283: Gulf of Guinea, 18–30 m.

REMARKS. The larger of the two specimens is 2 cm. by 2 cm. across the base, and 1 cm. high, massive with very uneven surface in the sense that it is thrown into irregular ridges and depressions, and with the surface further thrown into minute tubercles and cerebriform ridges. The skeleton consists only of styli, 0·78 by 0·014 mm., which are "remarquables par une courbure constante bien accentuée à peu de distance de la grosse extrémité".

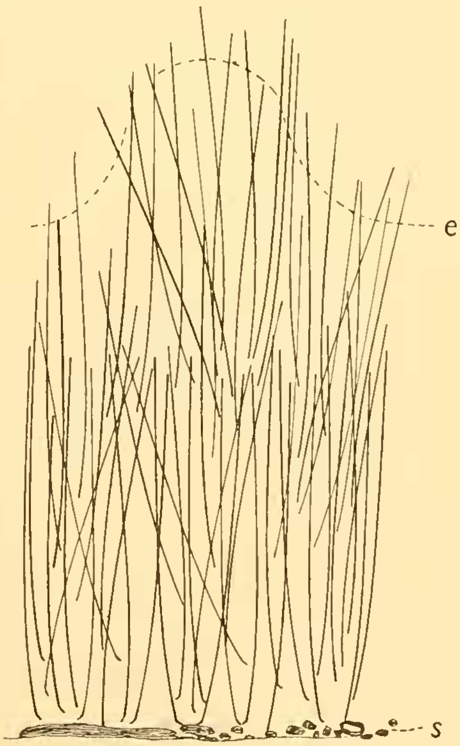

Fig. 35. *Stylohyalina hirta* (Topsent). Section at right angles to surface, to show the arrangement of the skeleton. *e*, ectosome, *s*, substratum.

The external form of the present specimens is very like that of the holotype, except that the surface is not raised into "des projections grêles et hispides", although it is minutely hispid throughout. Unfortunately, Topsent says nothing about the structure of the skeleton, but as the two specimens agree so closely in all other respects, I feel sure that the present specimen is conspecific with the holotype of *Amorphina hirta*, despite the fact that they were found at opposite sides of the Atlantic. The skeleton in the present specimen consists of loose bundles of styli running from the substratum to the surface (Fig. 29).

Distribution. West Indies.

Genus Plicatellopsis, gen.n.

Genotype. P. arborescens, sp.n.

Diagnosis. Axinellidae with main skeleton a confused or regular reticulation of styli or tylostyli from which ascending fibres pass outwards to dermis; dermal skeleton in form of bundles of small styli or tylostyli; interstitial spicules, when present, long slender tylostyli.

Remarks. The genus includes, in addition to the genotype, *P. flabellata*, sp.n. and *Plicatella expansa*, Thiele. The use of Schmidt's genus *Plicatella* (1870, p. 45: genotype, *Reniera labyrinthica*, Schmidt, 1864, p. 39, pl. iv, fig. 9) by Thiele is unjustified, since the only information we have is that the skeleton contains styli only. We know nothing of the arrangement of these styli, and it is probable that *Plicatella* is more closely related to *Stylohalina* than to any other genus. At the same time, there is a close relation between *Plicatella* and *Plicatellopsis*; but until the type of the former is redescribed it will be impossible to define it.

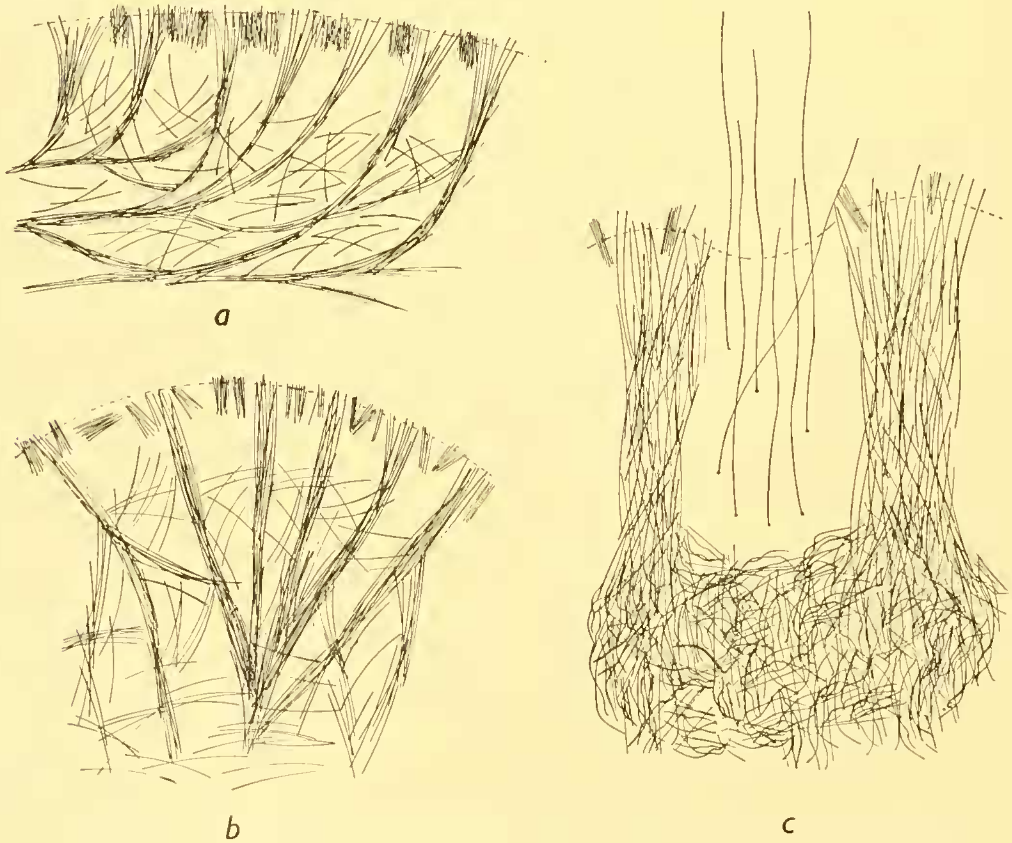

Fig. 36. Showing arrangement of skeleton in *a*, *Plicatellopsis expansa* (Thiele), *b*, *P. arborescens*, sp.n., *c*, *P. flabellata*, sp.n.

Plicatellopsis arborescens, sp.n. (Plate LVI, fig. 5; Figs. 36 *b*, 37 *b*).

Holotype. B.M. 28. 2. 15. 388.

Occurrence. St. WS 83: Falkland Islands, 137–129 m.; St. WS 243: Falkland Islands, 144–141 m.

DIAGNOSIS. Sponge erect, dichotomously branched; surface even, minutely hispid; texture firm, compressible, friable; oscules and pores not apparent; colour, in spirit, brown; skeleton an irregular reticulation of large styli giving off fibres which run vertically to surface; special dermal skeleton of bundles of small styli associated with outermost ends of ascending main fibres; large styli, slightly curved, 0·65 by 0·025 mm.; small styli, straight or slightly curved, 0·28 by 0·007 mm.

REMARKS. The skeleton is rather confused, its plan being obscured by the abundance of isolated spicules scattered between the main fibres. The small styli are chiefly confined to the dermis although a few, not in bundles, are to be seen scattered between the meshes of the main skeleton. There is no visible spongin.

The species differs from *P. expansa*, Thiele (Figs. 36 *a*, 37 *a*) in the external form and in the absence of any tylostyli.

Plicatellopsis flabellata, sp.n. (Plate LVI, fig. 6; Figs. 36 *c*, 37 *c*).

Holotype. B.M. 28. 2. 15. 726.

Occurrence. St. WS 84: Falkland Islands, 75–74 m.

DIAGNOSIS. Sponge irregularly flabellate, somewhat plicated; surface minutely tuberculate, markedly hispid; texture soft, friable; oscules and pores not apparent; colour, in spirit, brown; internal skeleton a confused mass of tylostyli, crossing each other at all angles, from which irregular fibres run vertically to surface; special dermal spicules in form of small styli; with long, slender tylostyli lying between ascending fibres of main skeleton; tylostyli of main skeleton usually much curved, 0·4 by 0·014 mm.; small styli of dermal skeleton, 0·2 by 0·003 mm.; long, slender, flexuous tylostyli, 2·0 by 0·01 mm.

REMARKS. There is a marked relation between this species and *P. expansa*, Thiele (cf. Figs. 34 *a*, 35 *a*), and *P. arborescens*, sp.n., but it differs from both in external form, in the disposition of the skeleton and in having tylostyli in the main skeleton and small styli for dermal spicules.

Genus **Bubaris**, Gray

Bubaris vermiculata (Bowerbank).

(For synonymy see Dendy, 1924, p. 351.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.; St. 283: Gulf of Guinea, 18–30 m.

DISTRIBUTION. Throughout Atlantic Ocean; Kerguelen; New Zealand.

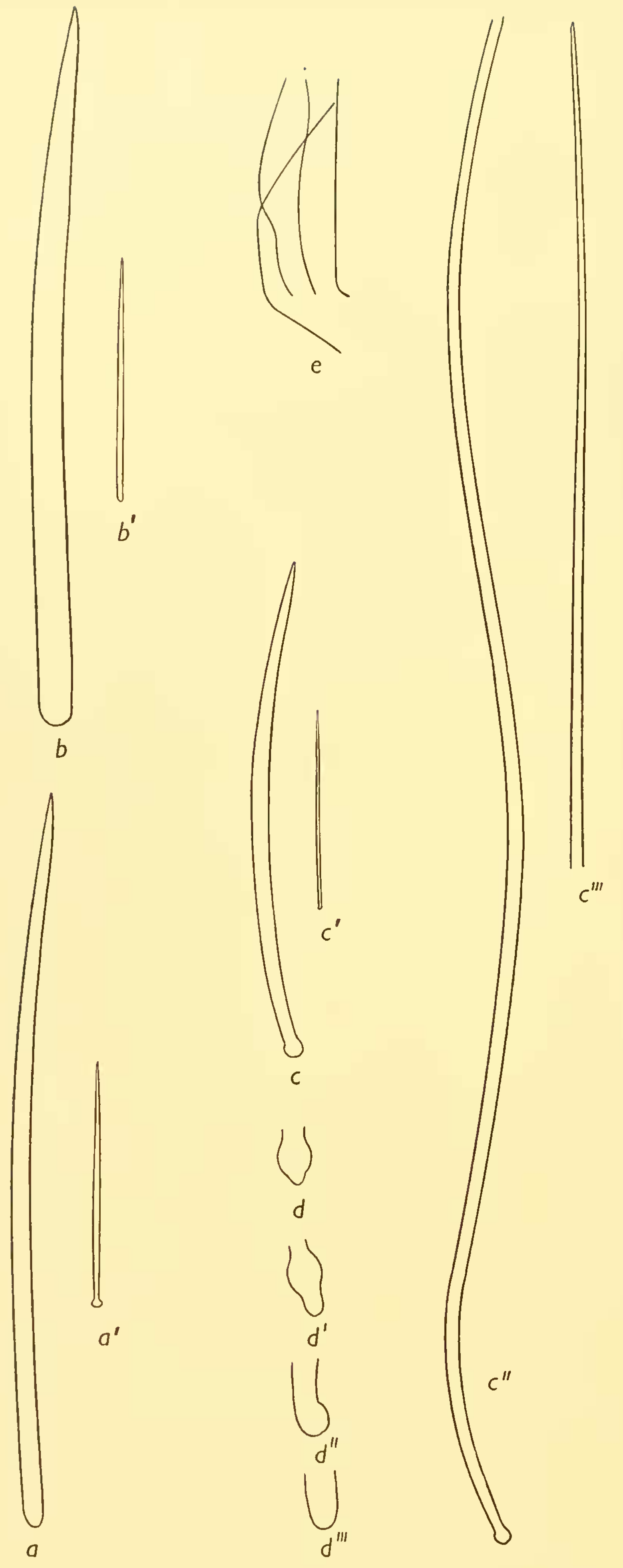

Fig. 37. *a*, *Plicatellopsis expansa* (Thiele), large style and small tylostyle; *b*, *P. arborescens*, sp.n., large and small styli; *c–e*, *P. flabellata* (*c* = tylostyle of main skeleton, *c'* small style, *c''*, *c'''* long flexuous tylostyle, *d–d'''* bases of tylostyli of main skeleton, *e* showing shapes of main tylostyli).

Bubaris murrayi, Topsent.

B. murrayi, Topsent, 1913, p. 616, pl. iii, fig. 1.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

REMARKS. It is probable that this species is synonymous with *B. vermiculata*.

DISTRIBUTION. Gough Island.

Genus **Ceratopsis**, Thiele

Ceratopsis incrustans, sp.n. (Fig. 38).

Holotype. B.M. 28. 2. 15. 435.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DIAGNOSIS. Sponge encrusting; surface even, minutely conulose; oscules and pores not apparent; texture soft, compressible; colour, in spirit, grey; skeleton a multispicular subisodictyal reticulation of styli of two sizes, larger 0·48 by 0·015 mm. and smaller 0·3 by 0·006 mm.; microscleres, toxiform microxea, 0·1 by 0·004 mm., scattered throughout choanosome.

REMARKS. The species differs from all previously known members of the genus *Ceratopsis* in the dimensions of its spicules and in its external form.

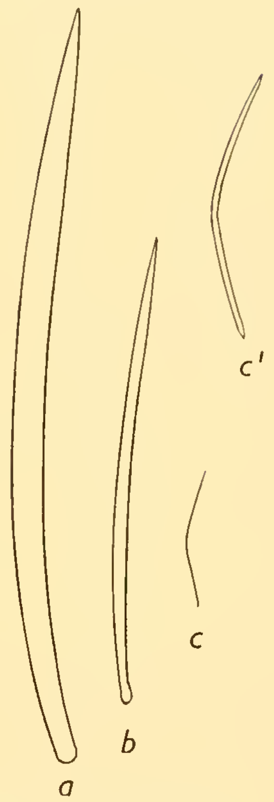

Fig. 38. *Ceratopsis incrustans*, sp.n. *a*, large style; *b*, small style; *c*, *c′*, toxiform microxeote. *a*, *b* and *c*, × 200; *c′*, × 400.

Genus **Eumastia**, Schmidt

Eumastia attenuata, Topsent.

E. attenuata, Topsent, 1915, p. 35, figs. 1, 2.

Occurrence. St. 53: Falkland Islands, 0–2 m.

DISTRIBUTION. Falkland Islands.

Family CLAVULIDAE

Genus **Suberites**, Nardo

Suberites montiniger, Carter.

S. montiniger, Carter, 1880, p. 256; Vosmaer, 1882, p. 31, pl. i, fig. 26, pl. iv, figs. 137–139; Topsent, 1892, p. 130; Lambe, 1894, p. 128, pl. iv, fig. 4; Swartschewsky, 1906, p. 319, pl. xiii, fig. 4; Topsent, 1915, p. 39; *Pseudosuberites montiniger*, Hentschel, 1916, p. 6; *Suberella topsenti*, Burton, 1929, p. 446, pl. iv, fig. 5.

Occurrence. St. WS 239: Falkland Islands, 196–193 m.

REMARKS. Since writing my Terra Nova Report, I have had occasion to examine a number of specimens of *S. montiniger*, Carter, from the northern hemisphere and am now convinced that the sponges recorded by Topsent (*loc. cit.*) and myself, from the Antarctic, are identical with Carter's type.

DISTRIBUTION. Burdwood Bank; Victoria Land.

Suberites microstomus, Ridley and Dendy, var. stellatus, Kirkpatrick.

S. microstomus, var. *stellatus*, Kirkpatrick, 1908, p. 19, pl. xv, figs. 8–13.

Occurrence. St. 152: South Georgia, 245 m.; St. 190: Palmer Archipelago, 315 m.

DISTRIBUTION. Victoria Land.

Suberites papillatus, Kirkpatrick.

S. caminatus, var. *papillatus*, Kirkpatrick, 1908, p. 20, pl. xv, fig. 16, pl. xvi, figs. 11–14; *Tentorium papillatum*, Topsent, 1917, p. 36, pl. iv, fig. 2; *Suberites papillatus*, Burton, 1929, p. 445.

Occurrence. St. 156: South Georgia, 200–236 m.; St. 160: Shag Rocks, 177 m.; St. 170: Clarence Islands, 342 m.; St. 190: Palmer Archipelago, 93–130 m.

DISTRIBUTION. Graham Land; Victoria Land.

Genus Pseudosuberites, Topsent

Pseudosuberites hyalinus (Ridley and Dendy).

(For synonymy see Burton, 1929, p. 445.)

Occurrence. St. 6: Tristan da Cunha, 80–140 m.; St. 152: South Georgia, 245 m.; St. 157: South Georgia, 970 m.; St. WS 243: Falkland Islands, 144–141 m.

DISTRIBUTION. Europe; Red Sea; Patagonia; Graham Land; Victoria Land.

Pseudosuberites sulcatus, Thiele.

(For synonymy see Burton, 1929, p. 334.)

Occurrence. St. 58: Falkland Islands, 1–2 m.; St. 156: South Georgia, 200–236 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 90: Tierra del Fuego, 82–81 m.; St. WS 91: Tierra del Fuego, 191–205 m.; St. WS 108: Falkland Islands, 118–120 m.

REMARKS. The collection includes an encrusting form, comparable with *Suberites incrustans*, Brøndsted, two encrusting forms with convoluted surface, and one massive specimen with papillate outgrowths resembling the holotype of the species. There are, in addition to these, five large irregularly flabellate specimens, but as this particular growth form is being dealt with in my forthcoming report on the sponges of the Swedish Antarctic Expedition I refrain from further comment here.

DISTRIBUTION. Tierra del Fuego; Gough Island; South Georgia; Victoria Land; Auckland and Campbell Islands.

Genus Tentorium, Vosmaer.

Tentorium semisuberites (Schmidt).

Thecophora semisuberites, Schmidt, 1870, p. 50, pl. vi, fig. 2; *T. ibla*, Thompson, 1873, p. 148, fig. 24; *T. semisuberites*, Whiteaves, 1874, p. 9; *T. ibla*, Verrill, 1874, p. 500, pl. viii; *T. semisuberites*, Vosmaer, 1885, p. 18, pl. i, figs. 23, 24, pl. iii, figs. 22–26; *Tentorium semisuberites*, *id.*, 1885, p. 329, pl. ii, fig. 4, pl. xxi, fig. 19; Ridley and Dendy, 1886, p. 489; *id.*, *loc. cit.*, p. 221; *Thecophora semisuberites*, Fristedt, 1887, p. 433; *Tentorium semisuberites*, Lambe, 1896, p. 198, pl. iii, fig. 2; *id.*, 1900, p. 25; Arndt, 1912, p. 113; Topsent, 1913, p. 25; Ferrer, 1914, p. 19.

Occurrence. St. 6: Tristan da Cunha, 80–140 m.

DISTRIBUTION. Arctic and Atlantic Oceans.

Genus Polymastia, Bowerbank

Polymastia isidis, Thiele (Fig. 39).

P. isidis, Thiele, 1905, p. 414, figs. 25, 38 *a–c*; *P. isidis*, var. *simplex*, Hentschel, 1914, p. 47, pl. v, fig. 3.

Occurrence. St. 187: Palmer Archipelago, 259 m.; St. WS 81: Falkland Islands, 81–82 m.; St. WS 82: Falkland Islands, 140–144 m.; St. WS 86: Falkland Islands, 151–147 m.; St. WS 248: Falkland Islands, 210–242 m.; St. WS 250: Falkland Islands, 251–313 m.

REMARKS. The species is represented by nearly a dozen specimens, all agreeing closely with each other, but differing slightly from the holotype in external form and minor details of the spiculation. They are all cushion-shaped, standing on a circular base, and the upper surface bears a varying number of wart-shaped papillae. The papillae are never elongate, as in the type, but always low, not exceeding 2–3 mm. in height, and in some not perceptibly raised above the level of the surrounding surface. The chief difference in the spiculation is the presence of a peculiar annulation on many of the large tylostyles. The normal base of these tylostyles is as shown in Fig. 39 *c*, but more than 50 per cent have a base such as that shown in Fig. 39 *b*, while Fig. 39 *a* represents the condition in about 10 per cent. Many of these spicules are polytylote, as in the type, but wherever this occurs the swellings on the shafts are of the kind shown in Fig. 39 *a*.

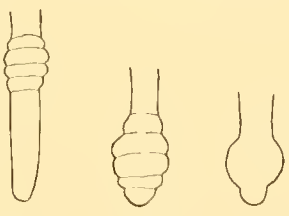

Fig. 39. *Polymastia isidis*, Thiele; showing variations in shape of bases of megascleres. × 300.

At first sight, it would appear that the differences between the specimens here described and the type of the species are sufficient to justify the recognition of a new variety, but the general similarity in texture, appearance of the surface, disposition of the spicules in the skeleton, and the shape of the normal megascleres make it fairly certain that the Discovery specimens represent at the most a tropus (*sensu* Vosmaer) of *P. isidis*.

Making this more certain, there are a further nine specimens in the collection which resemble closely in external appearance the dozen specimens referred to above. These are mostly cushion-shaped, but one is irregularly massive and one sub-spherical. The surface of each is even and only minutely hispid; and in most of them the papillae are less than 3 mm. high, but in two they are 5 mm. or more high and agree closely with those of the holotype. As regards the spiculation, the larger megascleres in most of these nine specimens have the same type of base figured by Thiele (*loc. cit.*) for the holotype, a few show traces of the annulation recorded above for the first group of specimens, and in a few this annulation is fairly strongly marked. In some of the specimens, also, there is no trace of the polytylote megascleres. We see in this group therefore a series of typical specimens, together with all transitions between them and the group of abnormal specimens described above.

The differences between the typical form and Hentschel's var. *simplex* are so slight, especially when compared with those found in the present specimens, that I can see no reason at all for maintaining this variety. In fact, if we compare the relation between the holotype and Hentschel's specimen with the relations between the various individuals recorded under *P. mammillaris*, or any other species of *Polymastia*, there is not the slightest justification for the introduction of this variety.

It is probable, to judge by the written description, that Brøndsted's (1923) *P. granulosa* from the Auckland and Campbell Islands will also prove to be synonymous with *P. isidis*.

Distribution. Falkland Islands; Wilhelm Land.

Polymastia invaginata, Kirkpatrick.

P. invaginata, Kirkpatrick, 1907, p. 271; *id.*, 1908, p. 15, pl. xii, fig. 1, pl. xiv, figs. 5–15; *P. invaginata*, var. *gaussi*, Hentschel, 1914, p. 49, pl. v, fig. 4; *P. invaginata*, Burton, 1929, p. 446.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 156: South Georgia, 200–236 m.; St. 167: South Orkneys, 244–344 m.; St. 177: South Shetlands, 1080 m.

Remarks. There are three specimens of this species which, although typical in all essential respects, differ in appearance and in the disposition of the spicules; and these differences seem to have a bearing on the problem of the extrusion of spicules. The first specimen is cupola-shaped, 2 cm. across and 1 cm. high, with smooth minutely hispid surface and normal spiculation. That is to say, the large megascleres are arranged in regular radial bundles and the smaller spicules in a dermal palisade and in stellate groups within the choanosome. There are no large spicules protruding at the surface. The second specimen is sub-spherical, 2 cm. in diameter, and in this the surface is smooth, or only minutely hispid, for the most part, but bears several patches of long protruding spicules. The general appearance is, in fact, very like that of a long-haired mammal in the last stages of shedding its coat. Moreover, the spicules composing these shaggy patches are not firmly embedded in the tissues, but may be removed with the greatest ease, and without the use of the slightest force, with a pair of forceps. Internally, the spiculation is not quite normal. The radial bundles are normal, but the characteristic stellate groups of small megascleres are not to be seen, these spicules being irregularly scattered through the choanosome. The third specimen, incomplete but larger than the two preceding specimens, is very conspicuously shaggy throughout the whole surface. Internally, the spiculation is very disordered: the smaller megascleres are most irregularly distributed and the larger megascleres are not only fewer in number than is usual but do not form the usual radial bundles. Instead they are arranged in a very confused manner.

I have (1931) suggested the possibility that the individuals of this species periodically extrude their spicules and the present specimens appear to offer strong support to this view. The first specimen is quite obviously in a normal condition. The third, equally obviously, is not, but has every appearance of being in the process of extruding the bulk of its larger megascleres at the surface. Specimen 2, on the other hand, appears equally certainly to be in the final stages of a "moult," with the remaining patches of the extruded spicules still loosely adhering to the surface, while internally the skeleton is resuming its normal arrangement.

Distribution. Victoria Land; Wilhelm Land.

Genus **Sphaerotylus**, Topsent

Sphaerotylus antarcticus, Kirkpatrick.

(For synonymy see Burton, 1929, p. 446.)

Occurrence. St. 160: Shag Rocks, 177 m.

Distribution. Victoria Land; Wilhelm Land.

Genus **Stylocordyla**, Thomson

Stylocordyla borealis (Lovén), subsp. **acuata**, Kirkpatrick.

S. borealis, var. *acuata*, Kirkpatrick, 1908, p. 22, pl. xvi, figs. 6–10; Hentschel, 1914, p. 34; *S. borealis*, subsp. *acuata*, Burton, 1928, p. 66, fig. 6; *S. borealis*, var. *acuata*, *id.*, 1929, p. 445.

Occurrence. St. 42: South Georgia, 120–204 m.; St. 123: South Georgia, 230 m.; St. 144: South Georgia, 155–178 m.; St. 160: Shag Rocks (depth doubtful); St. 167: South Orkneys, 244–344 m.; St. 175: South Shetlands, 200 m.; St. 177: South Shetlands, 1080 m.; St. 190: Palmer Archipelago, 93–130 m.

Distribution. Victoria Land; Wilhelm Land.

Genus **Spirastrella**, Schmidt

Spirastrella purpurea (Lamarck) (Plate LVI, fig. 7).

(For synonymy see Vosmaer, 1911.)

Occurrence. St. 283: off Annobon, Gulf of Guinea, 18–30 m.

Remarks. The specimen is similar to those figured by Vosmaer (*loc. cit.*, pl. iii, fig. 2, pl. iv, fig. 6) in appearance. The surface is obscured, except for papillate processes, by calcareous débris and much débris is included throughout the tissues. The habitus recalls that of *Spirastrella aurivilli* forma *excavans*, Lindgren (1898, p. 41) and the spicules are almost identical with those of *S. congenera*, Ridley (cf. Vosmaer, *loc. cit.*, pl. xii, fig. 1).

Distribution. Indo-Australian area; West Indies.

Genus Latrunculia, Bocage

Latrunculia lendenfeldi, Hentschel.

L. lendenfeldi, Hentschel, 1914, p. 44, pl. v, fig. 1.

Occurrence. St. WS 81: Falkland Islands, 81–82 m.; St. WS 83: Falkland Islands, 137–129 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 88: Falkland Islands, 96–127 m.; St. WS 243: Falkland Islands, 144–141 m.; St. WS 246: Falkland Islands, 267–208 m.; St. WS 248: Falkland Islands, 210–242 m.

DISTRIBUTION. Wilhelm Land, Antarctic.

Genus Cliona, Grant

Cliona aethiopicus, sp.n. (Fig. 40).

Holotype. B.M. 28. 2. 15. 724.

Occurrence. St. 283: Gulf of Guinea, 18–30 m.

DIAGNOSIS. Tylostyli of usual form, 0·26 by 0·007 mm.; spirasters with short stout shaft and a few conical spines, 0·028 mm. long.

REMARKS. The single specimen is found in a fragment of a thick (*Ostraea*?) shell. It resembles very closely *C. chilensis*, Thiele, but differs in the measurements of the spicules (in Thiele's species these are: tylostyli 0·3–0·33 by 0·017 mm., and spirasters 0·018 mm.). Had this specimen been found in a locality adjacent to the type locality, I should have had no hesitation in identifying it with *C. chilensis*, but the geographical separation combined with the differences in the dimensions of the spicules have caused me to regard it as a separate species.

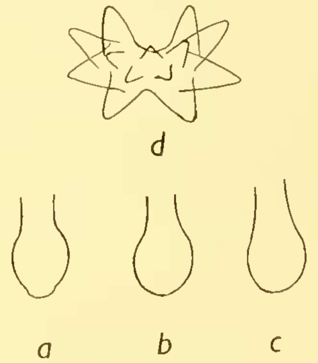

Fig. 40. *Cliona aethiopicus*, sp.n. *a–c*, bases of tylostyli, *a* being the more frequently found; *d*, spiraster, × 700.

Order EUCERATOSA

Genus Halisarca, Dujardin

Halisarca dujardini, Johnston, var. **magellanica**, Topsent.

H. dujardini, var. *magellanica*, Topsent, 1901, p. 44, pl. i, fig. 2, pl. vi, figs. 11–14; Burton, 1929, p. 414.

Occurrence. St. 55: Falkland Islands, 10–16 m.; St. 58: Falkland Islands, 1–2 m.; St. 222: Cape Horn, 30–35 m.; St. WS 79: Falkland Islands, 131–132 m.

DISTRIBUTION. Victoria Land; Londonderry Island.

Genus Spongia, Linnaeus

Spongia officinalis, Linnaeus, Autt.

Occurrence. St. 1: Ascension Island, 16–27 m.

REMARKS. The single specimen has the external form of *Euspongia officinalis adriatica* (Schulze, 1879, pl. xxxiv, fig. 2), but is black in colour.

DISTRIBUTION. Mediterranean; West Indies; Indian Ocean; Australia.

Spongia magellanica, Thiele.

S. magellanica, Thiele, 1905, p. 483, figs. 18, 106.

Occurrence. St. 156: South Georgia, 200–236 m.; St. WS 84: Falkland Islands, 75–74 m.; St. WS 89: Tierra del Fuego, 23–21 m.

REMARKS. The fibres of the first specimen contain sand grains only, those of the second specimen contain only fragments of sponge spicules. Otherwise the two specimens are identical and both resemble the holotype closely.

DISTRIBUTION. Punta Arenas and Calbuco.

Genus **Duseideia**, Johnston

Duseideia fragilis (Montagu), Autt.

Occurrence. St. 1: Ascension Island, 16–27 m.

REMARKS. The specimen is thinly encrusting, but resembles the European forms of the species very closely in structure.

A synonymy of this species will be given in my report on the Barrier Reef sponges.

DISTRIBUTION. Practically cosmopolitan.

Duseideia chilensis (Thiele).

Spongelia chilensis, Thiele, 1905, p. 485, fig. 20.

Occurrence. St. WS 84: Falkland Islands, 75–74 m.

DISTRIBUTION. Chile.

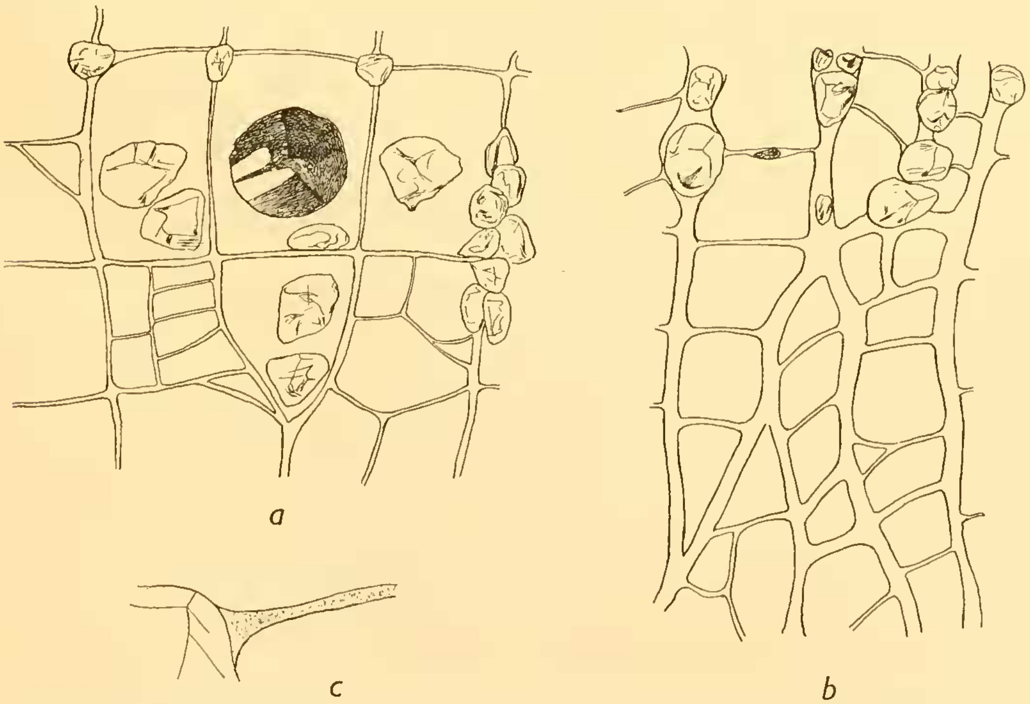

Fig. 41. *Duseideia tenuifibra*, sp.n. *a*, fibres near periphery of sponge; *b*, from near the base; *c*, showing method of attachment of fibres to sand grains.

Duseideia tenuifibra, sp.n. (Plate LVI, fig. 8; Fig. 41).

Holotype. B.M. 28. 2. 15. 840.

Occurrence. St. WS 243: north-east of Falkland Islands, 144–141 m.

Diagnosis. Sponge lobate; surface minutely conulose; oscules 2–4 mm. diameter, situated at or near ends of lobes; texture soft, compressible; colour, in spirit, greyish-green; skeletal fibres very thin, 0·014–0·02 mm. in diameter, forming an irregular network of nearly quadratic mesh, with meshes subdivided by more slender fibres; sand grains not abundant, incorporated in fibres or lying loosely in meshes of skeleton.

Remarks. The species is characterized by the slenderness of its fibres and by the external form. The manner in which the included sand grains are held together is unusual. Instead of being entirely enclosed by the fibre, the grains are connected together by short strands of spongin the ends of which are attached to the surfaces of the sand grains (see Fig. 41 *c*). Near the base of the sponge, and in the inner parts of the lobes, the fibres are thicker and the meshes of the skeleton reduced in size (cf. Fig. 41 *b*).

Genus **Dendrilla**, Lendenfeld

Dendrilla membranosa (Pallas).

(For synonymy see Burton, 1929, p. 448.)

Occurrence. St. 45: South Georgia, 238–270 m.

Distribution. Wilhelm Land; Victoria Land; Graham Land; Australia; Indian Ocean.

THE AFFINITIES OF THE ANTARCTIC SPECIES OF *TEDANIA*, WITH NOTES ON THE DISTRIBUTION OF THE GENUS GENERALLY

Of the six species of *Tedania* recorded on pp. 302–9 five resemble each other so closely that their identification presents an unusual difficulty, but at the same time raises two points of interest. The first of these points concerns the difficulty of classifying these species; and the second concerns the new importance of embryological observations in systematic studies. Nearly 200 specimens of *Tedania* were collected from the sub-Antarctic and Antarctic and at first no satisfactory classification seemed possible. This was largely due to the strong similarity in the shape of their spicules. Certainly, the various specimens differed in many ways and could be divided into five groups on the basis of external form, but even then many intermediates could be found between the typical forms of these five groups. Similarly, each group was characterized by a particular range of spicule size, but here again intermediates could be found. It was, in fact, only when the embryos were studied, and the data so obtained used as a starting-point for the eventual classification, that it became possible to decide on the identification of these specimens.

It is of some importance to emphasize that the close resemblance of all these specimens of *Tedania*, and the fact that they present numerous intermediates would under other circumstances have suggested that all were conspecific, had the embryology not indicated otherwise. In fact, had the characters of the embryos been overlooked, we should have had in *Tedania* a similar position to that presented by Vosmaer (1911) in his study of *Spirastrella purpurea* (Lamarck), and (1932 *et seq.*) in his studies of the Porifera Incalcaria of the Bay of Naples. And while I believe that Vosmaer was mainly correct in his conclusions regarding *S. purpurea* (there are points, of course, where he has obviously gone wrong), it would be better to endeavour to apply the embryological test as far as possible, both to this and all other species. This gives to the study of embryology an importance, hitherto unsuspected, as the deciding criterion in systematic work.

The characters and close relationship of the five species of *Tedania* here recorded are given in the table on p. 308.

In dealing with so large a collection, it was found possible after a while, and once the main distinguishing features were appreciated, to classify specimens with considerable certainty even in the absence of embryos. Nevertheless, so closely are these five species related and interdigitated in regard to their main characters that several specimens could only doubtfully be assigned to a species. Where only a few specimens are found in a collection therefore, it is conceivable that this difficulty will be considerably increased, unless embryos can be found in them.

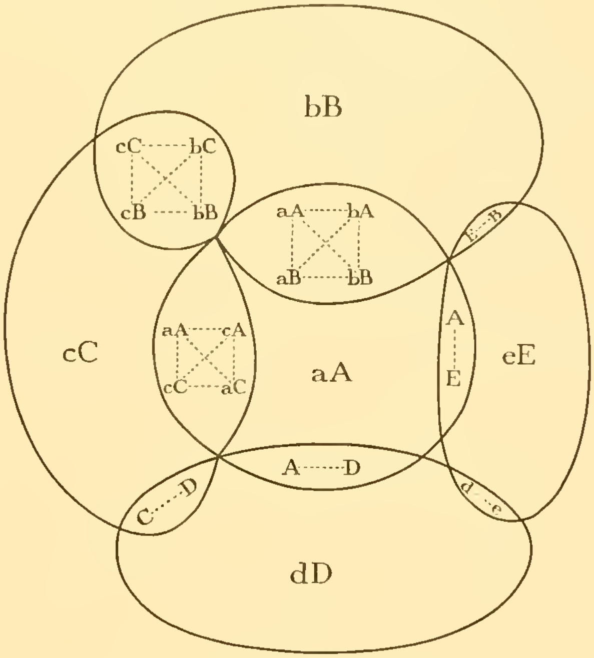

Fig. 42. Diagram showing relationships and overlapping in the Antarctic and sub-Antarctic species of *Tedania*. The five main areas represent types of embryology: *aA*, *T. tenuicapitata*; *bB*, *T. charcoti*; *cC*, *T. massa*; *dD*, *T. spinata*; *eE*, *T. murdochi*. *a–e* represent types of spiculation and *A–D* external forms of these species respectively.

In order to stress the importance of the conclusions reached in this study of the species of *Tedania*, it is considered worth while to express graphically the relationships of these species, so that these may be contrasted and compared with the diagram given by Vosmaer (1911, p. 324) for *Spirastrella purpurea* (Lamarck). Vosmaer shows seven groups representing typical forms of *S. purpurea* and indicates how these are connected by intermediates. From this he concludes that the specimens comprising these groups are all conspecific. In the present case, the corresponding groups are much more closely connected and may be represented, not by detached circles, but by overlapping areas (Fig. 42), and yet the specimens they represent actually belong to different species. For example, in the area where *T. massa* overlaps *T. tenuicapitata* may be included the

Table showing comparison of chief distinguishing features in Antarctic species of Tedania.

Species	External form	Surface	Ectoparasitic amphipods	Oscules	Main skeleton *	Styli †	Tornota ‡	Onychaeta §
T. spinata (Ridley)	Flabellate, branching or irregularly massive	Smooth	Abundantly present usually	Small in linear series on margins of flabellate and branching specimens	Rectangular or triangular network, with sides of meshes formed of 2–4 spicules	Smooth or bearing occasional spines near base: 0·165–0·28 × 0·005–0·011 mm.	0·18–0·24 × 0·004–0·007 mm.	0·052 to 0·21 mm., not divided into groups of different sizes
T. tenuicapitata, Ridley	Flabellate or irregularly massive	Thrown into meandrine folds of varying size	Commonly present	Small, scattered	Rectangular or triangular network, with sides of meshes formed of 2–4 spicules	Smooth: 0·35–0·49 × 0·007–0·018 mm.	0·188–0·39 × 0·004–0·012 mm.	0·07–0·18 and 0·28–0·43 mm.
T. murdochi, Topsent	Irregularly massive to massively flabellate	Wrinkled	Absent	Large, conspicuous, on mammiform processes	Rectangular meshes, with ascending fibres obviously stronger than conjunctives	Smooth: 0·21–0·23 × 0·007–0·008 mm.	0·18–0·22 × 0·004–0·005 mm.	0·04–0·21 mm., not divided into groups of different sizes
T. charcoti, Topsent	Massive, often with digitate or flabellate processes, to sub-clathrate	Wrinkled, smooth, or thrown into meandrine folds	Occasionally present	Apparently absent, to large and conspicuous, borne on mammiform processes	Rectangular network, with sides of mesh formed of 2–4 spicules	Smooth: 0·35–0·53 × 0·001–0·03 mm.	0·24–0·39 × 0·007–0·021 mm.	0·08 and 0·29 mm.
T. massa, Ridley and Dendy	Conical (i.e. carrot-shaped) to spherical, massive or flabellate	Even, smooth	Commonly present	Large and arranged in linear series (on flabellate forms) or scattered (on massive forms), to collar-shaped (in conical forms)	Spicules in bundles of 2–5, scattered, seldom forming a coherent network	Smooth, with tendency to become strongylote: 0·44–0·78 × 0·01–0·04 mm.	0·3–0·5 × 0·007–0·012 mm.	0·07–0·28 and 0·4–0·7 mm.

* The characters given here are typical for the respective species: there is, however, some variation and overlapping.

† In all cases, the typical style is smooth, slightly curved, and ending in an abrupt point at the distal end. In *T. spinata*, the only variation is the presence of occasional spines near the base, but these are not present in every specimen. In *T. massa* the typical form of the style tends to be modified more frequently than in the other species by a rounding off of the distal end.

‡ The shape of the ends of the tornota is very variable, more so in some species than in others, and more particularly in certain individuals. To use this character for purposes of classification would therefore be unsound.

§ Reference has already been made to the unreliability of the onychaeta for purposes of classification. In this column only typical cases are given, the variations being mainly neglected.

discoid specimen, with spicules of small size, which was to all intents a specimen of *T. tenuicapitata*, but which was found to contain embryos typical of *T. massa*. Topsent's (1908, pl. i, fig. 3) *T. charcoti* might be placed in the area where *T. murdochi* and *T. charcoti* overlap. And so on. As will be seen from the diagram, *T. spinata* and *T. tenuicapitata*, *T. massa* and *T. spinata*, and *T. murdochi* and *T. charcoti* can only be confused in external form, and *T. spinata* and *T. murdochi* resemble each other only in spiculation. On the other hand, *T. tenuispiculata*, *T. charcoti* and *T. massa* are subject to considerable confusion.

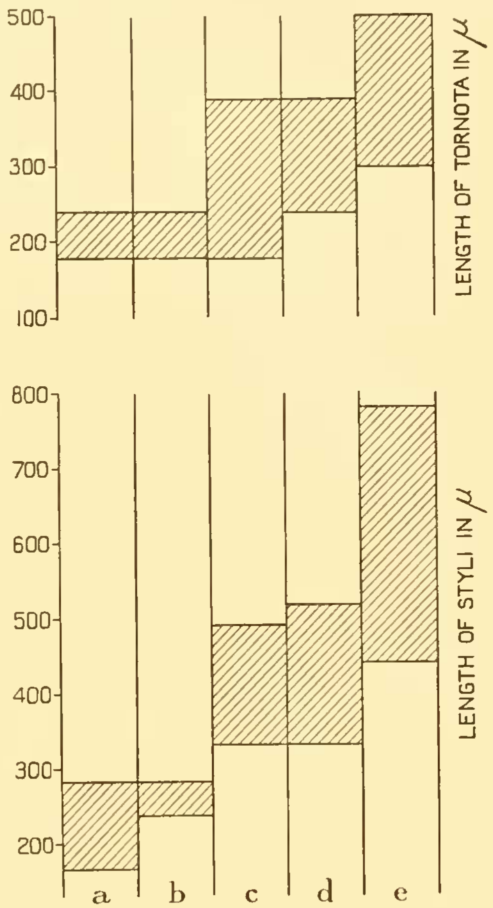

Fig. 43. Showing the relative lengths of the styli and tornota in: *a*, *T. spinata*; *b*, *T. murdochi*; *c*, *T. tenuicapitata*; *d*, *T. charcoti*; *e*, *T. massa*.

The second point raised is that concerning the specialized character of these species as compared with the remaining species of *Tedania*.[1]

Judging from the embryological evidence, and the development of the external form and spiculation, *Tedania nigrescens* (Schmidt) is the most primitive species of the genus, and the Antarctic group, including also *T. mucosa*, Thiele, *T. excavata*, Thiele, *T. pectinicola*, Thiele, *T. fuegiensis*, Thiele, and *T. infundibuliformis*, Ridley and Dendy, is the most specialized. And of these, the species found in the Antarctic (*sensu stricto*) are the most highly specialized of all. Thus, in *T. oxeata* the styli are replaced by pseudoxea (cf. the life history of *Iophon radiatus*, Topsent (Burton, 1931, p. 514, fig. 2*e*)); *T. charcoti* shows a higher degree of development than the others, since the fully-developed embryonic spicules are styli; but in *T. massa* is found the most convincing proof that the Antarctic species are more specialized than the non-Antarctic. In

[1] The section Tedanieae, of the Desmacidonidae, consists at present of the genera *Tedania*, Gray; *Trachytedania*, Ridley; *Tedaniopsis*, Dendy; *Paratedania*, Burton; *Tedaniella*, Czerniavsky; and *Tedanione*, Wilson. As shown on p. 306, *Trachytedania* must be regarded merely as representing the post-larval stage of *Tedania spinata* (Ridley) and perhaps others. Further, *Tedaniopsis* and *Paratedania* are clearly synonyms and, as shown on p. 306, the genotype of the latter is synonymous with *Tedania massa*, Ridley and Dendy. *Tedanione*, on the other hand, appears to be synonymous with *Rhaphoxya*, one of the Axinellidae, and *Tedaniella*, inadequately characterized, may be a synonym of *Petrosia*.

The species of *Tedania*, as here understood, appear to number 24: *T. bispinata*, Hentschel; *T. charcoti*, Topsent; *T. commixta*, Ridley and Dendy; *T.* (*Tedanione*) *connectens* (Brondsted); *T. coralliophila*, Thiele (with *T. brevispiculata*, Thiele; *T. maeandrica*, Thiele; and *T. reticulata*, Thiele, as probable synonyms); *T. diraphis*, Hentschel; *T. diversirhaphidiophora*, Brondsted; *T. excavata*, Thiele; *T. fragilis*, Lambe; *T. fuegiensis*, Thiele; *T. infundibuliformis*, Ridley and Dendy; *T. massa*, Ridley and Dendy; *T. mucosa*, Thiele; *T. murdochi*, Topsent; *T. nigrescens* (Schmidt) (see Burton and Rao, 1932, p. 353, for full synonymy);

this species the form varies from massive or flabellate, to the highly specialized form which I have called "carrot-shaped" (cf. fig. 25 *d*, p. 304). The specimens of this species

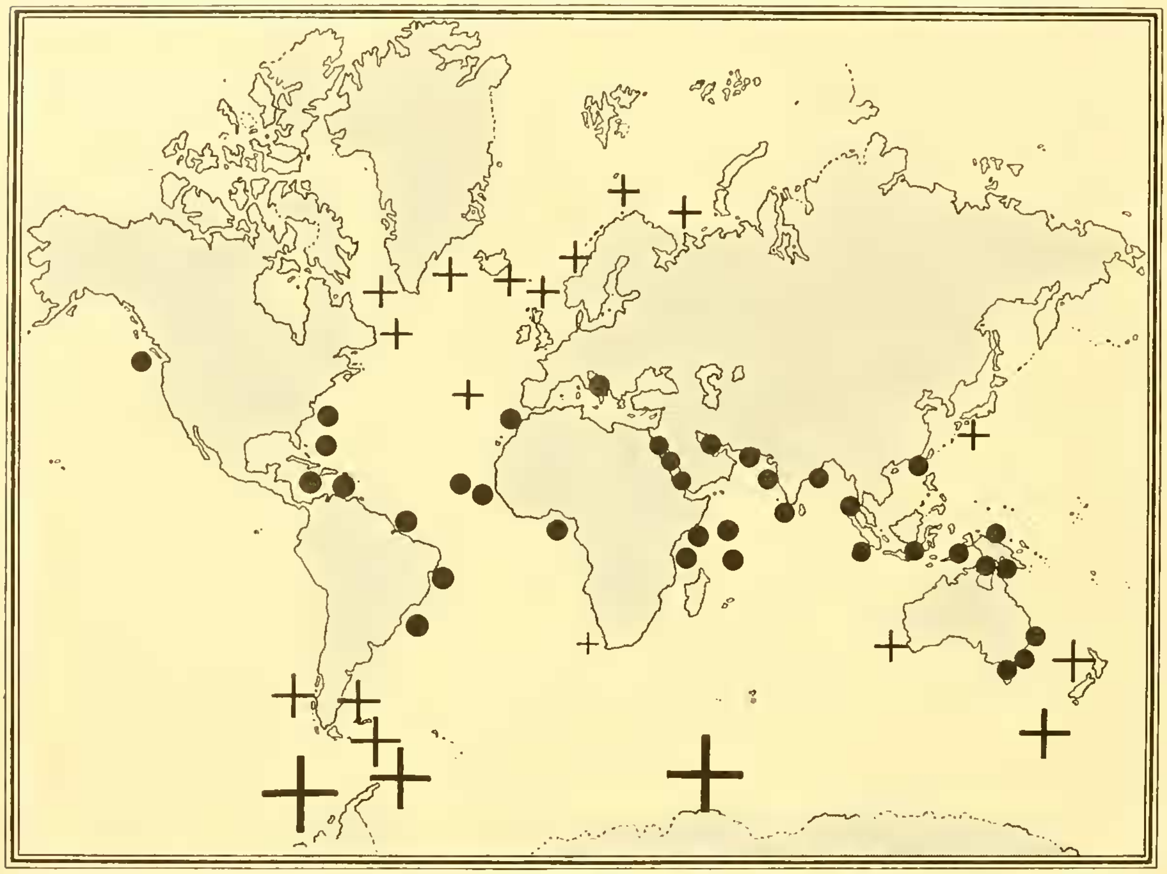

Fig. 44. Plan of distribution of the species of *Tedania*. *T. nigrescens*, Schmidt, is represented by the black dots, the remaining species by crosses. The size of the crosses is proportionate to the degree of specialization attained by the species they represent.

in the present collection, classified as follows, show how this specialization is increased as the Antarctic continent is approached:

Locality	Massive to flabellate (primitive)	"Carrot-shaped" (specialized)
Falkland Islands	20	1
South Georgia	4	4
Antarctic continent	—	20

T. oxeata, Topsent; *T. pectinicola*, Thiele; *T. phacellina*, Topsent; *T. placentaeformis*, Brondsted; *T. scotiae*, Stephens; *T. suctoria*, Schmidt (with *T. increscens*, Schmidt, and *T. conuligera*, Topsent, as synonyms); *T. tenuicapitata*, Ridley and Dendy; *T. (Tedanione) wilsoni* (Dendy); and *T. (Tedaniopsis) turbinata* (Dendy).

[The following must be removed from the genus *Tedania*: *T. crista-galli*, Dendy, to Axinellidae; *T. coulmani*, Kirkpatrick, to *Kirkpatrickia*; *T. variolosa*, Kirkpatrick, to *Kirkpatrickia*; *T. laevis*, Kirkpatrick, to ? Plocamicae; *T. laxa*, Lendenfeld, to *Stylotella agminata*, Ridley; *T. tenuispina*, Lendenfeld, to *Stylotella agminata*, Ridley; *T. leptoderma*, Topsent, to *Lissodendoryx isodictyalis*, Carter.]

The picture presented by the distribution of these species (Figs. 44, 45) is thus a very interesting one. We have one species, *T. nigrescens* (Schmidt), the least specialized of the genus, variable in form, having a wide distribution, and all round the margins of its area of distribution are found species of slightly more advanced development and greatly restricted distribution. The culmination is found in the sub-Antarctic and Antarctic species which appear to show a continued progression in development

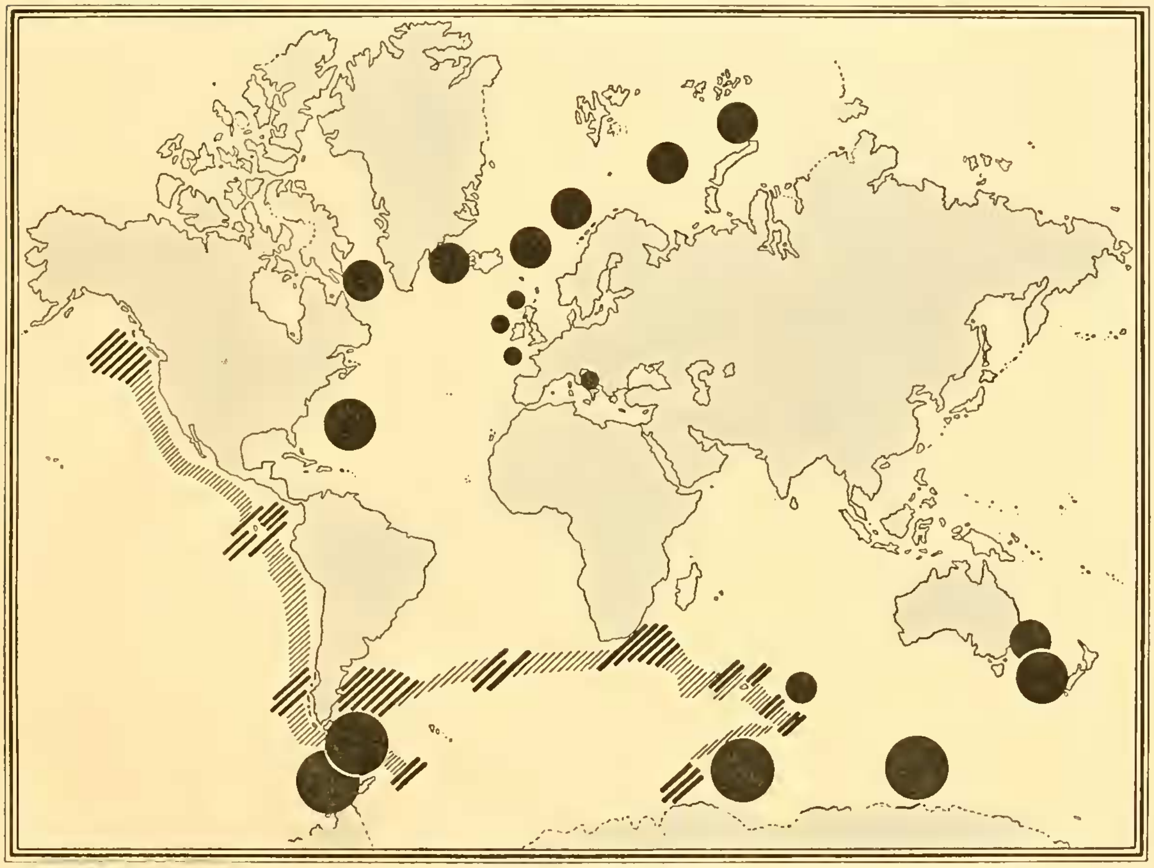

Fig. 45. Plan of distribution of the species of *Iophon*. The shaded area represents the distribution of *I. proximum*, Ridley, the darker lines coinciding with localities at which the species has been actually recorded, the thin lines where it may be assumed to occur. The size of the black dots, representing the remaining species of the genus, are proportionate in size to the degree of specialization of the species.

as the Antarctic is approached, until, within the Antarctic itself, we have the three most specialized species of all, *T. charcoti*, *T. massa* and *T. oxeata*. This picture, in fact, suggests the possibility that this variable species, fluctuating considerably in its main characters, has given rise to a number of localized and more highly developed species at various points; and that from these have arisen other species with, generally, an increasingly higher degree of specialization as the polar waters are approached.

THE EVOLUTION OF THE SPECIES OF *IOPHON*, AND ITS SIGNIFICANCE IN RELATION TO OTHER ANTARCTIC SPECIES OF ECTYONINAE

The genus *Iophon* provides another striking plan of the distribution of species and, in addition, a probable indication as to the generation of species. In the North Atlantic, restricted to the coasts of the Mediterranean, and of Western Europe as far north as the British Isles, are two species, closely allied and apparently the most primitive of the genus. These are *I. pattersoni* (Bowerbank) and *I. hyndmani* (Bowerbank). It is a remarkable fact that these two species are almost invariably found growing in association. That is to say, if, in a single haul of the dredge, examples of one species are obtained, examples of the second will almost certainly be present also. There is yet a third species, *I. scandens* (Bowerbank), of rare occurrence, the characters of which are intermediate between those of the other two species. It appears probable that future research may show either: (i) that these three species represent different growth stages of a single species; (ii) that *I. pattersoni* and *I. hyndmani* are forms of a single dimorphic species, and *I. scandens* an occasional intermediate; or (iii) that *I. pattersoni* and *I. hyndmani* are distinct species, and possibly *I. scandens* a hybrid. At all events, it will be convenient to regard them here as representing a single primitive species.

The remaining six species of the genus are all more specialized than the foregoing in many respects, especially in their external form and in the shape of the bipocilla. The first of these is *I. piceus*[1] (Vosmaer), found on the coasts of Norway and in the Arctic. The second is *I. proximum* (Ridley), which is found throughout the sub-Antarctic, from Kerguelen (and Natal) to South America, up the western coast of South America to the Galapagos, on the western coast of North America and possibly round to the eastern coast of Canada. In addition, it is found rarely in the Antarctic. The third species, *I. laminalis*, Ridley and Dendy, from Prince Edward Island, is closely related to, if not synonymous with, *I. proximum*. The fourth, *I. omnivorus*, Ridley and Dendy, from Australia, is slightly degenerate, though still somewhat more specialized. The fifth, *I. laevistylus*,[2] from New Zealand, is more specialized. The sixth, *I. melanokhemia* (de Laubenfels) from Puget Sound, is probably also a specialized offshoot from *I. proximum*. The last, and most specialized, *I. radiatus*, Topsent, though also found in the Falkland Islands area of the sub-Antarctic, is most numerous in the Antarctic proper. This species, in its development, passes at first through a stage recalling the *hyndmani-pattersoni* group, and, later, shows certain features associated with *I. proximum*.

The picture (Fig. 45) presented by these species may be summarized as follows. The group represented by *I. hyndmani* and *I. pattersoni* is a primitive one, and from it, to

[1] There can be little doubt, in view of the variability of the spicules found in *I. radiatus* and *I. proximum*, that *I. piceus*, Vosmaer, *I. frigidus* (Levinsen) and *I. dubius* (Hausen) are conspecific; especially as they are so alike in external form.

[2] *Iophon major* and var. *tenuis*, Brondsted, and *I. minor*, Brøndsted, are quite evidently conspecific with *I. laevistylus*, Dendy, in view of what is now known concerning the variations in all species of *Iophon*.

the north, a more specialized species has sprung (*I. piceus*). To the south, it has given rise to *I. proximum*, again a slightly more specialized species, but one in a state of extreme fluctuation as regards its spicular characters (cf. Figs. 22–24). From this variable species have arisen several more specialized species, which have migrated in a southerly direction: *I. laminalis* in the Southern Ocean, *I. omnivorus* in Australia, *I. laevistylus* in New Zealand, and *I. radiatus* in the Antarctic. At the northern limit of its range of distribution, it has possibly given rise to another specialized species, *I. melanokhemia*.

We have here an indication that the species of *Iophon* have developed from a form the prototype of which is located in the North Atlantic, and that its most specialized species is found in the Antarctic. The same thing may be said of the species of *Mycale*. In point of numbers, the species of the North Atlantic (i.e. on the European side) are the most numerous. Elsewhere the species of this genus are found mainly in the Antarctic and sub-Antarctic, and in the Indo-Australian area; but whereas the Indo-Australian species are either little more specialized than those of the North Atlantic, or, more commonly, degenerate (cf. *Arenochalina mirabilis*, Lendenfeld, from Australia, a degenerate *Mycale*), the Antarctic species are somewhat more specialized than any of the rest. Moreover it may be noted that the six Antarctic species of *Mycale* are found in localities bordering on the area of distribution of *M. magellanica* (Ridley), a species comparable with *Iophon proximum* (Ridley) in the variability of its spiculation. Finally, we find that the two most specialized species of *Mycale*, *M. intermedia*, Schmidt, and *M. acerata*, Kirkpatrick, are found in the Arctic and Antarctic respectively.

The distribution of the genus *Amphilectus* is also similar to that of *Iophon* and *Mycale*. The least specialized and most variable species, *Amphilectus fucorum* (Johnston), is distributed generally around the European coasts and in the Arctic, is found on the west coast of Africa, around the southern extremity of South America, in the Antarctic, and finally at New Zealand. Again we find specialized species, *A. quatsinoensis* (Lambe), on the west coast of Canada, and *A. americana* (Ridley and Dendy) around the southern extremity of South America. In addition, there are *Corybas lobata* (Johnston) in the North Atlantic and Arctic, and *Brondstedia glaber* (Brøndsted) in the Antarctic, both of which must be regarded as species closely related to *Amphilectus fucorum* but slightly more specialized.

The genus *Isodictya* is confined practically to the Arctic, European coasts, south coast of Africa, southern extremity of South America, the Antarctic and New Zealand. And again we find the most primitive species in European waters, while around South Africa the species of this genus show a rich development in numbers of species, size of individuals and growth of spicules. This progressive tendency in the South African species of *Isodictya* is carried still farther in the sub-Antarctic and Antarctic, where the genus reaches its highest degree of development.

There is in this a striking parallel which cannot be ignored, and which suggests that four of the most primitive sections of the Desmacidonidae—the Isodictyeae, the Mycaleae, the Tedanieae and the Iophoneae—have each arisen in an area approximating to the European side of the North Atlantic, and from thence have spread northwards to the

Arctic in one direction, and southwards to the Antarctic, along the west coast of Africa, in the other, with a lateral path of migration extending into the Indian Ocean. The remaining sections of the Desmacidonidae, the Myxilleae and Clathrieae, are world-wide in distribution; but here again the more primitive species are found in the North Atlantic, and so far as the Myxilleae are concerned, the more highly developed species are found in the sub-Antarctic and Antarctic.

Nor can we ignore the coincidence that the widely distributed and primitive species *Iophon proximum*, *Tedania nigrescens* and *Amphilectus fucorum*, with a very variable spiculation or external form, have a number of more highly developed species, which appear to have developed from them, around the fringes of their areas of distribution.

With the line of progression from Europe to the Antarctic, down the west coast of Africa, shown by the species of *Isodictya*, *Amphilectus*, *Mycale*, *Iophon* and *Tedania*, may possibly be correlated the curious, discontinuous distribution shown by the species of *Plakina* (*P. monolopha*, *P. dilopha*, and *P. trilopha*, together with several others) which are found only in the Mediterranean and the Antarctic. The full significance of this cannot yet be assessed, but it is a matter which should not be overlooked. How this particular distribution has been effected is a question which raises numerous difficulties.

Brøndsted (1926) has suggested that the distribution of New Zealand sponges may be best explained on the Wegener hypothesis; but whereas, in some parts of the world, the Wegener hypothesis will explain the distribution of sponges as well as any other hypothesis yet put forward, it is entirely insufficient in dealing with the sponges of the Atlantic Ocean. The main features of the distribution of sponges in this area are on the whole contrary to what might be expected on the Wegener hypothesis. They are as follows:

(1) The dissimilarity of the fauna of the eastern coast of the United States of America and that of Europe.

(2) The similarity between the fauna of the West Indies and that of the Indo-Australian area.

(3) The existence of species common to the European and West African coasts, the sub-Antarctic (as represented by the Falkland Islands area) and the Antarctic, and their absence elsewhere in the Atlantic.

(4) The presence in the Antarctic of several species found hitherto only in the Mediterranean.

Nor can the "creeping" of species around the coasts explain more than a small proportion of the facts of distribution of species. I have already suggested (1930) a correlation between the main surface currents of the ocean and the distribution of sponges in the North Atlantic, and it is now proposed to show that a similar correlation exists in the South Atlantic and Indian Oceans.

GEOGRAPHICAL DISTRIBUTION

In the following Table, which represents the distribution of species in the Antarctic and sub-Antarctic and in the adjacent areas, no mention is made of species newly described in this report, of cosmopolitan or widely distributed species, or of species with a limited distribution. The sole purpose of the Table is to indicate approximately the relations between the various localities, indicated at the head of the Table, in so far as their respective sponge faunas are concerned.

	Antarctic (Victoria Land, Wilhelm Land, etc.)	Graham Land (including Palmer Arch., S. Shetlands and Elephant Group)	S. Orkneys	S. Georgia (including Shag Rock)	Falkland Islands (including Burdwood Bank)	S. America (Chile, Patagonia, Tierra del Fuego)	Tristan da Cunha and Gough Island	Kerguelen Area	Campbell Island	Further Distribution
Rossella antarctica, var. *intermedia*	...	×	...	×						
R. nuda	×	×	...	×	×					
R. racovitzae	×	×	...	×	×					
R. villosa	×	×								
Gymnorossella inermis	...	×	...	...	×					
Leucosolenia discovereyi	×	...	...	...	×					
Leucetta leptoraphis	×	×	...	...	×					
L. macquariensis	...	...	...	×	×	...	...	...	...	Macquarie I.
Leucettusa haeckeliana	...	...	...	...	×	...	...	×		
Grantia cirrata, var. *aurorae*	×	...	...	×	×					
Plakina trilopha	×	×	...	×	×	...	...	...	...	Mediterranean
Geodia magellani	...	...	...	...	×	×				
Tetilla leptoderma	×	×	...	×	×	×	...	×		
Cinachyra antarctica	×	×	...	×						
C. barbata	×	×	...	×	×	...	...	×		
C. coactifera	...	...	...	×	...	...	...	×		
Haliclona nodosa	...	...	...	×	...	×				
H. chilensis	...	...	...	...	×	×				
H. variabilis	...	...	...	...	×	×				
H. penicillata	×	×	...	...	×					
H. gaussiana	×	...	...	×						
H. tubuloramosa	...	...	...	...	×	...	...	...	...	New Zealand
H. conica	...	...	...	...	×	...	...	...	...	New Zealand
Microxina benedeni	×	×	...	×	×					
Hemigellius rudis	×	×	...	×						
Adocia carduus	...	×	...	×	×	×	...	×		
A. glacialis	...	×	...	×	...	×	...	×		

	Antarctic (Victoria Land, Wilhelm Land, etc.)	Graham Land (including Palmer Arch., S. Shetlands and Elephant Group)	S. Orkneys	S. Georgia (including Shag Rock)	Falkland Islands (including Burdwood Bank)	S. America (Chile, Patagonia, Tierra del Fuego)	Tristan da Cunha and Gough Island	Kerguelen Area	Campbell Island	Further Distribution
Adocia siphonella	...	...	...	...	...	×	×			
A. cucurbitiformis	×	×								
Calyx arcuarius	×	×	×	×						
C. kerguelensis	...	...	×	×	...	...	...	×		
Dasychalina validissima	...	...	...	×	×	×				
Callyspongia fortis	...	...	...	...	×	×				
C. fusifera	...	...	...	...	×	×				
Isodictya kerguelensis	...	×	...	...	×	...	...	×		
I. kerguelensis, var. *simillima*	×	...	...	...	×					
I. setifera	×	×	...	×	×					
I. delicata	...	...	...	...	×	×				
I. antarctica	×	...	...	×	×					
I. cactoides	×	×	...	×						
I. erinacea	×	×								
Cercidochela lankesteri	×	×								
Plumocolumella maeandrina	×	...	...	×						
Mycale magellanica	×	×	...	×	×	×				
M. lapidiformis	...	...	...	...	×	×				
M. acerata	×	×	×	×						
M. tridens	×	×	...	×						
Amphilectus rugosus	×	...	...	...	×	×	×			
Biemna chilensis	×	×	...	...	×	×				
Asbestopluma calyx	×	...	...	×						
Acanthorhabdus fragilis	×	×								
Iophon radiatus	×	×	...	×						
I. proximum	...	...	...	×	×	×	×	×	...	Galapagos I., Canada
Tedania tenuicapitata	×	×	...	×	×	×				
T. oxeata	×	×								
T. massa	×	×	...	×	×					
Myxilla mollis	×	×	...	×	×	×				
M. asigmata	×	×	...	×						
M. chilensis	...	...	...	...	×	×				
M. elongata	×	...	...	×						
Ectyodoryx paupertas, subsp. *nobile*	...	...	...	×	×	×	...	×		
E. antarctica	×	...	...	×						
E. frondosa	×	×								
E. ramilobosa	×	×	...	×						
Anchinoë latrunculioides	×	×	...	×	×	×	...	...	...	South Africa
A. areolata	×	...	...	×	...	×				
A. leptochela	×	...	...	×						
Kirkpatrickia variolosa	×	×	...	×						

	Antarctic (Victoria Land, Wilhelm Land, etc.)	Graham Land (including Palmer Arch., S. Shetlands and Elephant Group)	S. Orkneys	S. Georgia (including Shag Rock)	Falkland Islands (including Burdwood Bank)	S. America (Chile, Patagonia, Tierra del Fuego)	Tristan da Cunha and Gough Island	Kerguelen Area	Campbell Island	Further Distribution
Kirkpatrickia coulmani	×	...	...	×						
Inflatella belli	×	...	...	...	×	...	...	...	...	New Zealand
Plocamia gaussiana	×	×	...	×						
Clathria papillosa	...	...	...	...	×	×				
C. toxipraedita	...	×	...	×	×					
Ophlitaspongia membranacea	...	×	...	...	...	×				
Artemisina apollinis	×	×	...	×	...	...	...	×	...	North Atlantic
A. plumosa	×	...	...	...	×					
Dictyociona discreta	...	...	...	...	×	×	×			
Axociella nidificata	×	×	...	×						
A. flabellata	×	×	...	×						
Pseudanchinoë toxifera	×	×	...	×	...	...	×			
Eurypon miniaceum	...	×	...	×	...	×	...	...	...	South Africa
Stylotellopsis amabilis	...	...	...	×	×	×				
Hymedesmia irritans	...	...	...	...	...	×	×			
H. laevis	...	...	...	...	×	×				
H. simillima, var. *antarctica*	×	...	×	...	×					
Crella crassa	×	×								
Crellina tubifex	×	×								
Hymeniacidon fernandezi	...	...	×	×	×	×				
H. torquata	...	×	...	...	...	...	×			
Thieleia rubiginosa	...	...	...	×	...	×				
Axinella crinita	...	...	...	...	×	×				
Pseudaxinella egregia	...	...	...	...	...	×	×			
Homaxinella supratumescens	×	×	...	×						
Rhizaxinella australiensis	×	×	...	...	...	...	...	...	...	Australia
Suberites montiniger	×	...	...	...	×					
S. microstomus, var. *stellatus*	×	×	...	...	×					
S. papillatus	×	×	...	...	×					
Pseudosuberites hyalinus	×	×	...	×	...	×	×	...	...	Europe
P. sulcatus	×	...	...	×	×	×	×	...	×	
Polymastia isidis	×	×	...	...	×					
P. invaginata	×	×	×	×						
Sphaerotylus antarcticus	×	×								
Stylocordyla borealis, subsp. *acuata*	×	×	×	×						
Latrunculia lendenfeldi	×	...	...	...	×					
Halisarca dujardini, var. *magellanica*	×	×	...	...	×	×				
Spongia magellanica	...	...	...	×	...	×				
Dendrilla membranosa	×	×	...	×	...	...	...	...	...	Australia; Indian Ocean

The following analysis may be made from the table:

Of the 69 Antarctic species:

50	are found also off	Graham Land.
43	,,	South Georgia.
29	,,	Falkland Islands.
11	,,	South America.
7	,,	Kerguelen.

Of the 56 species from Graham Land:

50	are found also in the	Antarctic.
32	,,	off South Georgia.
23	,,	Falkland Islands.
11	,,	South America.
5	,,	Kerguelen.

Of the 57 species from South Georgia:

43	are found also in the	Antarctic.
32	,,	off Graham Land.
19	,,	Falkland Islands.
13	,,	South America.
8	,,	Kerguelen.

Of the 51 species from Falkland Islands:

29	are found also in the	Antarctic.
23	,,	off Graham Land.
19	,,	South Georgia.
24	,,	South America.
6	,,	Kerguelen.

The list showing the species recorded from each station gives a clear insight into the distribution of species within the Antarctic and sub-Antarctic zones. Taken in conjunction with my table of Antarctic species (1929, pp. 394–401), there appears to be no really marked change in the fauna at Graham Land, where the species are dominantly Antarctic. The same is true for the South Shetlands; but at South Georgia there are, in addition to numerous Antarctic species, a number common to that locality and the Falkland Islands, and a few common to it and the mainland of South America. Around the Falkland Islands there are still many Antarctic species to be found; but the character of the sponge fauna is more that of the southern regions of the South American continent (e.g. Patagonia and Chile). One Antarctic and South American species is also recorded with this report (see p. 325) from the False Bay region of South Africa.

Taking the records contained in this report in conjunction with my previous papers (1929, Terra Nova Report, and 1930, Senckenbergiana) it becomes evident that there is no real distinction to be made, so far as sponges are concerned, between the faunas of the Antarctic or sub-Antarctic, nor is there any marked difference in the Magellan and Kerguelen regions (cf. Regan, 1914, Vol. 1, *British Antarctic 'Terra Nova' Exped. Rep.*). It appears, on the contrary, that there is a gradual diminution in the Antarctic species as we travel outwards from the Antarctic Continent. There are, however, several significant features of the distribution, which have an important bearing on the general problem of the distribution of species in the South Atlantic. These are: (i) that one species of Antarctic and one South American species are found around False Bay; and (ii) that on the eastern shore of the South American Continent some Antarctic species appear to have penetrated as far north as the mouth of the Rio de la Plata, but that beyond this the character of the fauna changes entirely. To understand the full significance of this it is necessary to consider the distribution of sponges in the South Atlantic in conjunction with that in the Indian Ocean.

In his monograph of the horny sponges (1889), von Lendenfeld refers to a number of species of Euceratose sponges as being common to both Australia and the West Indies, and found only in those two areas. At first sight it seems unlikely that a species should be restricted to two such widely separated areas, and unfortunately this author leaves no record as to where the material on which he worked may be found, so that it is not possible to verify his results by actual observation. Since, however, so many of his identifications have been shown to be inaccurate, his conclusions are apt to be regarded as unreliable. Moreover, the extreme difficulty of identifying species of the Euceratosa with certainty only serves to increase the doubt felt on this point. Recent observations have tended, however, to suggest that von Lendenfeld may have been correct in this case. For example, the single commercial sponge found on the Great Barrier Reef of Australia seems to be indistinguishable from some of the varieties of the Bahamas grass sponge, and is, so far as I am aware, not found elsewhere unless it be in the adjacent waters of the Indo-Pacific. The question remains therefore whether the superficial resemblance between the Barrier Reef sponge and the West Indian grass sponge may not be the result of convergence rather than of actual affinity. That this is no case of convergence, and that the two have a common origin, is suggested by the fact that at least five species of sponge, sufficiently well characterized to be identified without hesitation, are common to both the West Indies and Australia. Moreover, in some cases they have been found also in the Indian Ocean and on the west coast of Africa. This seems to have an important bearing on the problems concerning the distribution of sponges and on the systematic study of the group.

I have suggested (1930) that there might be some correlation between the distribution of sponges and the main surface currents of the oceans, and that the study of these currents might be of material benefit in interpreting the natural and well-marked areas of distribution which undoubtedly exist. This arose from the study of the sponge fauna of Norway, but the conclusions reached then concerning the North Atlantic appear to hold true for the South Atlantic also. Assuming this to be the case, the chart of the main oceanic currents is not only sufficient to show why the faunas of the Red Sea, Indian Ocean and Indo-Pacific differ little from each other, but also why that of the Barrier Reef of Australia should be composed almost exclusively of species belonging to those areas. This well-defined area of distribution, the Indian Ocean and Indo-Pacific area, ends abruptly in the west in the region of the Agulhas current. On the west and north it is bounded by the continents of Africa and Asia respectively, and in the south by the cold waters of the West Wind Drift, which is to all intents an impassable barrier to migration. The eastern boundary must be ignored for the present, as our knowledge of the sponges of the Pacific is so imperfect, and to avoid unnecessary complications the sponge fauna of Australia, exclusive of the Barrier Reef, must be left out of the reckoning. The area thus delimited, which for the sake of brevity may be called the Indian Ocean area, in addition to constituting a natural and well-marked faunal area, forms a closed system of circulatory currents, and it is easy to imagine that these two conditions are correlative. In the same way, that portion of the Atlantic south of a line approximating to the Equator constitutes a second well-defined area and forms also a partially closed system of circulatory currents. To the east and west it is bounded by the continents of Africa and America and to the south, again, by the waters of the West Wind Drift. To the north is a similar faunal area, with its circulatory system, with which the South Atlantic system is put into communication mainly by the Gulf Stream; and such species as are common to both North and South Atlantic follow a line of distribution which accords with the conclusions outlined in the paper already referred to. For the moment, then, it will be convenient to ignore the North Atlantic system.

We have thus two closed systems of currents, each with its well-defined fauna, and if we are to accept the hypothesis that the distribution of sponges is effected by surface currents, we should expect to find a complete absence of species common to the two areas. This is, as a general rule, true. A few species, not more than 2 per cent, have, however, migrated from the Indian Ocean to the South Atlantic; but these exceptions are apparent only and serve to test the rule, since having once gained entrance into the South Atlantic system, their distribution again follows the line of the main surface currents. On the other hand, and this at first sight seems to be a much greater obstacle to the development of the argument, while there is this migration from the Indian Ocean to the South Atlantic, there is no evidence of a similar migration from the South Atlantic to the South Pacific. This is the more remarkable since the gateway from the Indian Ocean to the South Atlantic and that from the South Atlantic to the South Pacific are so similar in character, both being barred by the meeting of a hot and a cold current, with a considerable difference in temperature between the two. When we come to look more deeply into the matter, however, we find that it is on the theory that the major factor in migration is transportation by currents, rather than the limiting effects of temperature, that this apparent anomaly can be explained.

The barrier between the Indian Ocean and the South Atlantic is situated along a line approximately due south of the Cape of Good Hope, and lies along the junction of the Benguela current passing northwards and the Agulhas current flowing southwards. The general faunas east and west of this line are markedly different, and this is almost certainly due to an abrupt drop in temperature in passing from the one current to the other; but the fact that some species do pass this line shows that the barrier is not complete. The second barrier, that between the South Atlantic and the South Pacific, is situated at a line approximately level with Buenos Aires on the South American coast and passes in a south-easterly direction to the region of the West Wind Drift. It is formed by the junction of the Brazil current running down from the north and a cold current flowing up from the region of the Magellan Straits. Here again there is a considerable difference in temperature between the two currents, nearly twice as great as that between the South African currents, and the fact that no South Atlantic species pass this barrier might be taken to mean that temperature was the deciding factor. But to my mind, a more important factor than temperature is the relation of the currents forming the two barriers, namely, that in the South African barrier the currents run parallel with each other, and though in opposite directions, are not opposed, while in the South American barrier

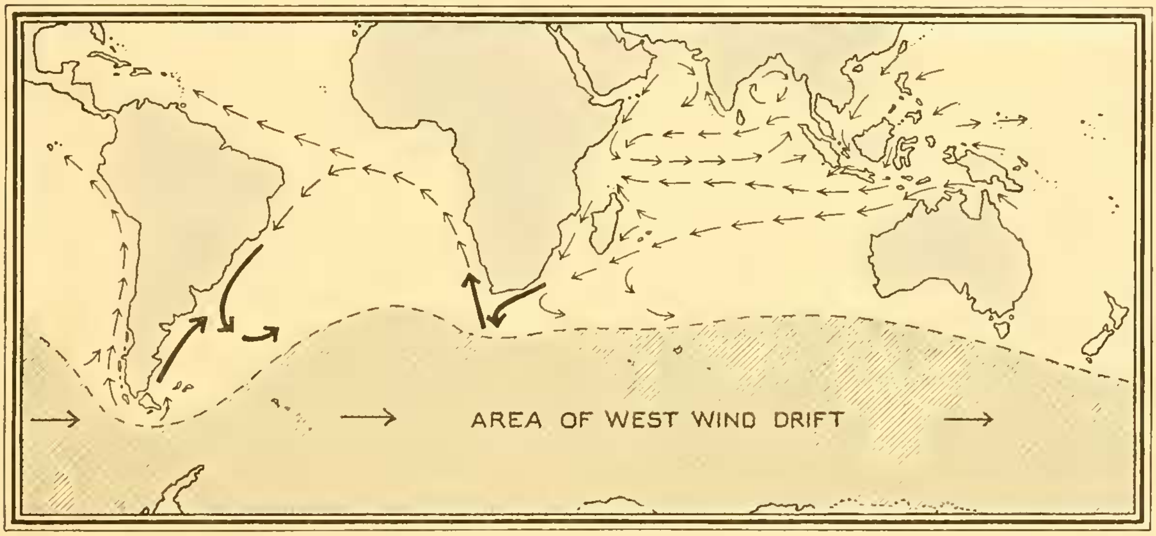

Fig. 46. Illustrating the two closed circulatory systems of currents in the southern hemisphere, in relation to the distribution of sponges in that area.

they are opposed. In the first case, the mixing of the waters at the line of junction allows the migrating sponges to be carried from the southerly directed Agulhas current into the northerly flowing Benguela current, and thence shortly to be restored to a third current, the South Equatorial, in which the temperature is similar to that of the Indian Ocean currents, whence they have come. Once in the South Equatorial current, their passage to the West Indies and the coast of Brazil is only a matter of time, and we do, in fact, find that one at least of the species common to the West Indies and Australia is also found on the coast of Brazil.

Assuming that the distribution of sponges is the result of transport by ocean currents, we should expect to find that the fauna north of Buenos Aires differs markedly from the fauna south of that line, and so far as our limited knowledge of these regions can show, this is actually the case. Unfortunately, we know very little of the faunas of these two regions, and future research may conceivably prove the contrary, but from a rapid examination made recently of a collection extending over these two areas this does not appear to be probable. What actually happens to make the South American barrier more effective than that of South Africa is, I imagine, that, since the currents are opposed, any mixing that may take place is nullified by the fact that the cold current from the south encounters and passes under the Brazil current, continuing its journey northwards beneath the surface. In this way, any floating bodies reaching the northern current will be restored once again to the warm surface waters of the South Atlantic.

While it is true that many details have yet to be considered and the hypothesis tested in other parts of the globe, it is reasonable to infer from the evidence afforded by the sponges common to the West Indies and Brazil, on the one hand, and to Australia, on the other, that while temperature does exercise considerable influence, their distribution will probably be found also to be correlated largely with ocean currents.

Theoretically, there is one great objection to this idea; that is the short duration of the larval period, and it was this objection that doubtless gave rise to the view hitherto held that extension of the range of distribution in sponges must always be explained by a slow creeping action round the margins of the land masses or along the sea-bottom, and that where a shallow-water species is represented in two areas widely separated by water, the land masses of these areas must at some time in the earth's history have been closely adjacent or actually connected. The free-swimming larval period of a sponge is normally 24 hours or less. Under abnormal conditions, as in marine aquaria, it may be extended to 2 or even 3 weeks, but this is exceptional and, owing to technical difficulties, it is not known whether such a larva will develop into a normal adult or not. The probability is that it does not. For all practical purposes, therefore, we must assume that the larval period is short, and that trans-oceanic migration on the part of the larva is either normally impossible or, if possible, that successful metamorphosis sufficient to establish the species cannot be accomplished at the end of the journey. On the other hand, it is not impossible that transport is effected after metamorphosis, and that young recently-metamorphosed individuals may be carried by floating objects. In this respect it is pertinent that the young sponge grows very little indeed for several weeks after metamorphosis, remaining usually as a thin inconspicuous incrustation, and in this condition it would not only escape observation but could be carried on floating fragments of such size and of such a nature as to be overlooked.

It is interesting to note that the species involved in this apparent migration from Australia to the West Indies belong to two groups only, the order Euceratosa and to the family Clavulidae of the order Tetraxonida. Whether it is that the larvae of these two groups have certain habits and characteristics which fit them for such migration, or whether the adult individuals are more adaptable and can become established in areas where individuals of other species, carried thither by the same migratory sequence, will perish, is a matter for future research. The important point is that some species of sponges appear to be capable of transportation over long stretches of oceanic waters by the medium of the prevailing currents.

The distance from Australia to the West Indies is very great, and from the presence of species of commercial sponges on the Barrier Reef of Australia identical with, or resembling extremely closely, sponges growing in the West Indies, we can only infer either that their superficial resemblance is due to convergence, which is improbable, or that the possible range of migration, of some species at least, is far greater than has been hitherto believed possible; or, and this is the most probable, that these sponges have also become established in favourable areas, perhaps extremely localized, in the Indian Ocean and the South Atlantic, which have not so far been recorded in the scientific literature. This is, to some extent, borne out by the record (St. 1, p. 340) of *Spongia officinalis*, Linnaeus, from Ascension Island.

EMBRYONIC DEVELOPMENT AND BREEDING SEASONS

It is probable that too little attention has been paid in the past to the value of describing embryos found in preserved material. From a purely embryological point of view such data as may be obtained from them is insufficient, but to the systematist the knowledge gained may be of immense value. Sections cut for purposes of identification may not ordinarily reveal the presence of embryos, which are often situated in the deeper parts of the sponge. For example, hand sections made from a specimen of *Tedania tenuicapitata*, Ridley, in the present collection, revealed no trace of embryos, but these were found in large numbers when the specimen was cut in two. Wherever practicable examination should therefore be made for embryos and their state of development and other cognate information recorded.

EMBRYONIC DEVELOPMENT

Since most information has been obtained regarding the development of the Antarctic species of *Tedania*, as compared with species of other genera, it will be convenient to deal with these first. Numerous embryos were found in some twenty or thirty of the specimens of *Tedania* examined and from these a fairly complete record of development in this group of species may be obtained. In most cases, the embryos present in a given specimen represent only a limited part of the developmental sequence; but in a specimen of *T. charcoti*, Topsent, the whole sequence can be followed in a few hand sections, from the unsegmented ovum up to the time at which the embryo escapes from its capsule. Embryonic development appears to follow the same course, broadly speaking, in all five of the Antarctic species, but differs considerably in such details as the size, shape and behaviour of spicules and in small details of histology.

The embryos of a single species, as represented by samples from several individuals, vary slightly in size, in the size and shape of the spicules, in the time at which the spicules appear and in the subsequent behaviour of these spicules; but such differences are small and are for the present purpose negligible. The specimens examined were all in the form of thin hand sections, cleared in clove oil, unstained or stained in borax carmine. In these preparations, the embryos appeared as solid bodies, but in a few instances specimens were found to have been satisfactorily sectioned by the razor. It was not possible, however, to study the histology in detail, this being reserved for a future occasion. The illustrations given represent optical sections and are intended mainly as accessory data for systematic study.

The embryonic development in *T. charcoti*, in which species a nearly complete series of embryos was obtained, may be conveniently dealt with under three headings: (i) the segmentation of the ovum and the differentiation of the cells so formed, (ii) nutrition, and (iii) the development of the spicules.

Tedania charcoti, Topsent

Segmentation. The ovum is first seen, in the deeper parts of the choanosome, as a semi-transparent body, charged with refringent granules, oval in shape, 0·1 by 0·07 mm., and lying in a capsule which is itself connected with the choanosomal tissues by radiating suspensoria (Fig. 47 *a*). The nucleus is at first faintly visible, but with the accumulation of food material is rapidly obscured. The first cleavage results in two cells of approximately equal size (Fig. 47 *e*), but the second gives rise to four cells of appreciably different sizes (Fig. 47 *f*). From this point onwards segmentation becomes very irregular (Fig. 47 *h*), but results finally in a spherical mass of cells (Fig. 47 *i*) of approximately equal size. Details of the intervening stages are missing, and the next stage in development seen is that represented by Fig. 47 *j*, in which the embryo, now oval and measuring 0·24 mm. in longest diameter, consists of a dense central mass of small granular cells, measuring 0·014 mm. in diameter, covered externally by a thin layer of much smaller, flattened cells. It is at this point that the first spicules make their appearance. After this the embryo increases considerably in size, becomes approximately spherical, 0·35 by 0·32 mm., and nearly transparent. A cortical layer of columnar cells becomes visible, 0·035 mm. thick, and the cells of the inner mass, now slightly smaller in size, are much more diffusely distributed. The succeeding stages are concerned mainly with changes in the distribution of the spicules (Fig. 47 *l*), and finally, a change in the outline of the embryo itself (Fig. 47 *m*). This latter is probably concerned solely with the escape of the embryo from the capsule, the walls of which have grown very thin (Fig. 47 *k*), and it appears as if the embryos are liberated from the capsule and make their way to the exterior by a series of quasi-euglenoid movements.

Nutrition. In the earliest stages, the embryonic capsule is thick-walled, and entirely empty except for the ovum, but in its walls may be seen a number of granular cells, spherical or oval in form, and measuring, on an average, 0·01 mm. across. Similar cells may also be seen in the suspensoria and in the adjacent choanosomal tissues. There can be little doubt that these are nutritive cells. Immediately prior to the first cleavage (Fig. 47 *b*) they become much more numerous and a few are seen migrating into the capsular cavity (Fig. 47 *c*), and as segmentation proceeds the cavity becomes partially filled with a granular mass (Fig. 47 *d*), derived presumably from the breaking down of these cells. The ovum, too, becomes more opaque and granular and assumes a golden yellow tint. After the second cleavage, the nutritive cells become appreciably less in the capsular wall (Fig. 47 *f*), the colour of the embryo deepening slightly, until in the later stages of segmentation they are only sparsely present. At this stage, raphides from the maternal tissues are carried in to support the wall of the capsule, which is from then onwards progressively reduced in thickness (Figs. 47 *h–j*). Finally, the wall loses its layer of raphides and becomes extremely thin (Fig. 47 *k*) in preparation for the escape of the embryo. The appearance of the raphides in the capsular wall appears to mark definitely the end of the nutritive period.

Development of Spicules. The first spicules to appear are extremely fine acanthostyli (Figs. 47 *j* and 53 *a*), 0·087 by 0·003 mm., lying in (or immediately beneath?) the outer layer of cells (cf. also *T. tenuicapitata*, Fig. 48 *c*). With the further differentiation of the embryonic tissues, as, for example, the formation of the outer cortical layer, the spicules migrate inwards, and become converted into smooth styli, measuring 0·14 by 0·007 mm. At the same time, small raphides, 0·07 mm. long, appear, scattered generally throughout the inner cell mass (Fig. 47 *k*). The further growth of the embryo is marked by a segregation of the styli in a neat bundle at the aboral pole of the embryo and a rapid multiplication in the numbers of the raphides (Fig. 47 *l* and *m*).

The raphides, the prototypes apparently of the adult onychaeta, resemble acanthostyli in their early stages, and it is probable that they are modifications of this spicule form, and not modifications of oxea, as is often inferred, and as appears to be the case in the raphides of other groups.

T. tenuicapitata, Ridley

Only a few embryos were found in three specimens, but from these it is clear that the development follows the same lines as that of *T. charcoti*. The earliest stage observed consists of a spherical mass of polyhedral cells contained in a capsule, the walls of which are strengthened with small onychaeta and contain a few nutritive cells (Fig. 48 *a*). The next stage found (Fig. 48 *b*) is of interest because in this the formation of the outer unicellular layer is seen to be in progress, but has not advanced sufficiently far for the inner cell mass to be completely covered. In addition, the formation of spicules can be seen to have begun in those parts of the outer layer which are well established. Fig 48 *c* represents a section through an embryo at a slightly later stage, and is intended to show the approximate position of the spicules in the early stages of their development. Fig. 48 *d* represents the latest stage obtained. The first spicules to appear are small roughened styli, 0·1 by 0·004 mm., followed by raphides, 0·07 mm. long.

T. murdochi, Topsent

Only the later stages were observed; and although the histology appears to be similar to that of *T. charcoti*, there are several points in which the embryos of the two species differ. The earliest embryo of *T. murdochi* is spherical and measures 0·28 mm., and the most remarkable feature about it is the manner in which the surface is thrown into loose folds (Fig. 50 *a*, *b*). The spicules are roughened subtylostyli, 0·14 by 0·003 mm., and raphides, 0·1 mm. long, and it may be remarked that, in contradistinction to the spicules of the embryos of other species, the subtylostyli of *T. murdochi* are arranged in opposite directions, some with the base directed orally and some with the base directed

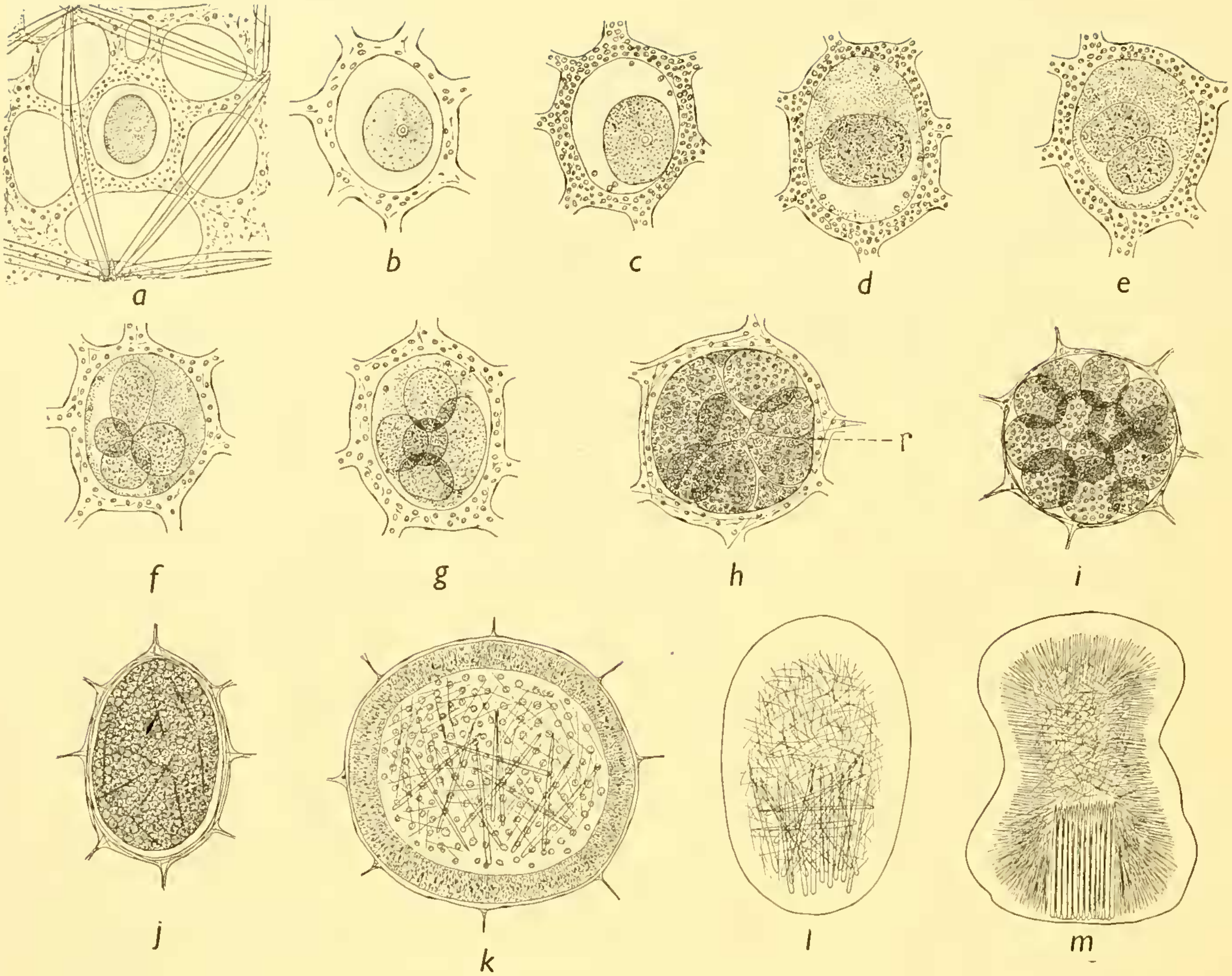

Fig. 47. *Tedania charcoti* (Topsent).
(In Fig. 47 *h*, *r* = residual nutritive matter.)

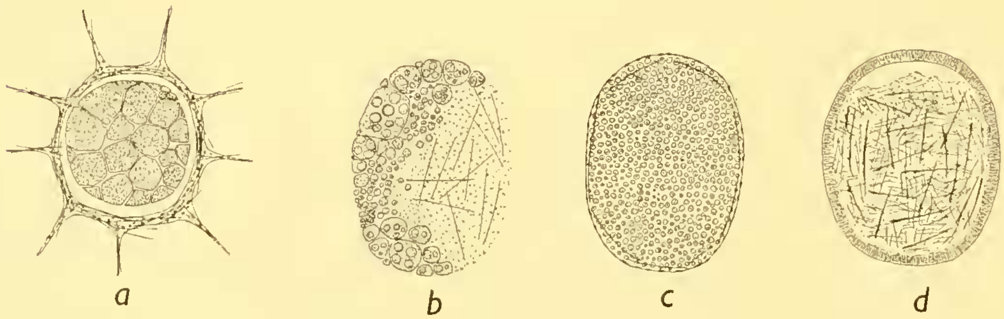

Fig. 48. *Tedania tenuicapitata*, Ridley.

EMBRYOLOGY OF ANTARCTIC

Note: All embryos are contained within a capsule,

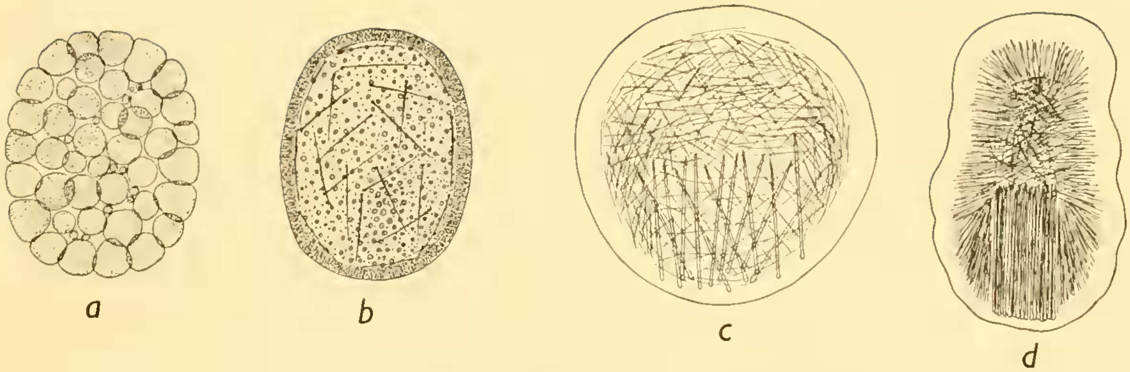

Fig. 49. *Tedania spinata* (Ridley).

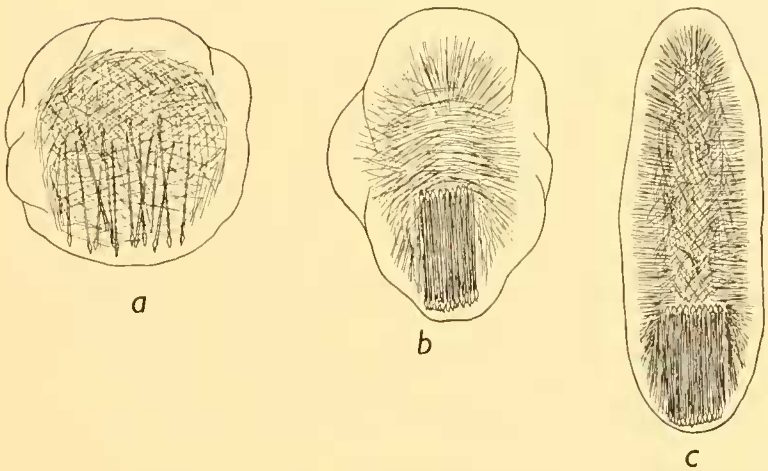

Fig. 50. *Tedania murdochi*, Topsent.

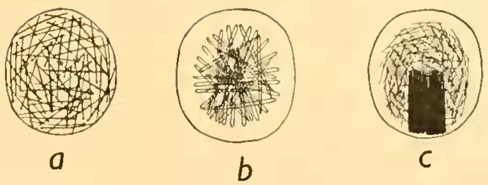

Fig. 52. *Tedania pectinicola*, Thiele.

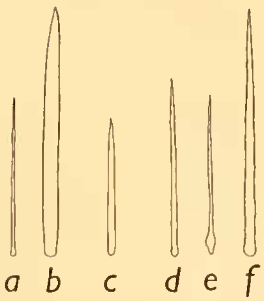

Fig. 53. Embryonic spicules: *a–b*, *T. charcoti*; *c*, *T. pectinicola*; *d*, *T. tenuicapitata*; *e*, *T. murdochi*; *f*, *T. spinata*.

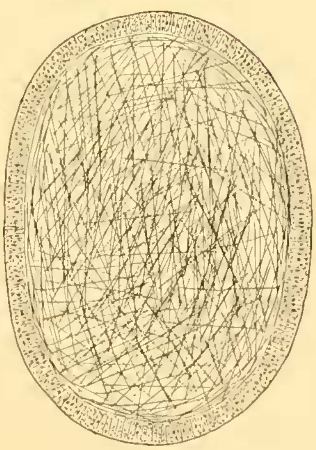

Fig. 51. *Tedania massa*, Ridley and Dendy.

Species of *Tedania*

whether this structure is figured or not, except 49*c*.

aborally (Fig. 50 *b*, *c*). After escape from the capsule the embryo assumes an elongated form (Fig. 50 *c*) and the conspicuous folds of the surface disappear.

T. spinata (Ridley)

The first stage observed consists of a sub-spherical mass of spherical to polyhedral cells of varying size, 0·035–0·07 mm. in diameter, the whole being 0·28 mm. long by 0·22 mm. across (Fig. 49 *a*). The subsequent histological changes resemble those of *T. charcoti* and result in an oval embryo with a central mass of granular cells and an outer, cortical layer of columnar cells (Fig. 49 *b*). The first spicules to appear are roughened styli, 0·15 by 0·004 mm., followed by raphides measuring 0·07 mm. long. The subsequent changes are similar to those found in *T. charcoti* (Figs. 49 *c* and *d*).

T. massa, Ridley and Dendy

A few large embryos (Fig. 51) were found in two specimens, all at about the same stage of development, so that it is impossible to say much concerning the development in this species. Two important features may, however, be noted: (i) the large size of the embryos, and (ii) that the first spicules to appear are raphides, measuring 0·14 mm. long.

T. pectinicola, Thiele

Although this species does not figure in the Discovery collections, drawings of embryos found in the type specimen are included (Fig. 52 *a–c*) for the sake of comparison with other species.

Other species in which embryos were found are:

Plakina monolopha, Schulze. A specimen, collected on January 17, contains numerous embryos in various stages of development.

P. trilopha, Schulze. One specimen collected on December 23 contains a few ova; the second, collected on March 14, is filled with embryos in all stages of development and a section of it presents the same appearance as that figured by Schulze (1877, pl. iv, fig. 20) for *Oscarella lobularis* (Schmidt). This is the first time the embryos of *Plakina trilopha* have been recorded, and although Schulze has figured the developmental stages of *P. monolopha*, which so far as they go do not differ from those of *P. trilopha*, he omitted to record the date on which reproduction takes place.

Haliclona bilamellata, sp.n. Two specimens, collected in April, contain scattered ova or embryos in very early stages.

Callyspongia flabellata, sp.n., collected in March, contains numerous oval embryos, 0·18 mm. in longest diameter. A few are aspiculous, but most of them contain oxea, 0·039–0·06 by 0·002 mm., which appear to arise as a tangential layer in the epiblast and then to migrate inwards to form, finally, a compact mass at the centre of the embryo (Fig. 54).

Isodictya setifer (Topsent). A specimen, collected on March 21, contains eggs (or young embryos?), spherical and with granular appearance, 0·087 mm. in diameter. A second specimen, collected on March 14, contains numerous large embryos, spherical or oval in shape, of a rich yellowish brown in colour which makes them very conspicuous, and measuring up to 1 mm. in longest diameter. There is no sign of spicules or of a marked differentiation into an inner cell mass and an outer layer of smaller cells.

Isodictya antarctica (Kirkpatrick). A specimen, collected on June 21, contains numerous large embryos similar to those of *I. setifer*, but more golden yellow in colour and measuring up to 0·8 mm. in diameter.

Guitarra fimbriata, Carter. A specimen, collected on July 17, contains a few aspiculous embryos, situated just beneath the surface, and measuring 0·1 mm. in diameter.

Mycale magellanica (Ridley). A specimen, collected on September 20, contains a few embryos in an early stage of development, 0·12 mm. in diameter.

Amphilectus fucorum (Johnston). A specimen, collected on March 24, contains numerous aspiculous embryos, spherical or oval, measuring 0·28 mm. in diameter, and a second specimen, collected on May 1, has oval embryos measuring 0·16 mm. in longest diameter.

Asbestopluma calyx, Hentschel. A specimen, collected on January 20, contains numerous embryos in an advanced stage of development. The spicules contained are clavate tylostyli (or styli), 0·1 by 0·007 mm., and anisochelae, 0·011 mm. chord. In the earliest stages seen tylostyli only are present, forming a compact bundle at the centre of the embryo. In others anisochelae have made an appearance and are scattered irregularly around this bundle, and in the most advanced embryos the bundle of tylostyli is surrounded at its upper (?) end by a dense corona of anisochelae (Fig. 54 *k*).

Iophon radiatus Topsent. Specimens, collected from January 9 to June 21, all contain embryos in an early stage of development. Those described by Kirkpatrick (1908), which are at a later stage of development, were obtained in February.

Anchinoë latrunculioides (Ridley and Dendy). A single specimen, collected on June 17, contains large oval, aspiculous embryos, measuring 0·4 mm. in longest diameter.

Anchinoë leptochela (Hentschel). The single specimen, collected in April, contains numerous embryos. Some are aspiculous, slightly flattened at one pole and measuring 0·32 mm. diameter. Others, of approximately the same size but regularly spherical, contain numerous chelae of the same shape as those in the adult and, in some instances, a few acanthostyli. The chelae measuring 0·021 mm., about two-thirds the size of those of the adult, and the acanthostyli 0·092 mm. long.

Kirkpatrickia variolosa (Kirkpatrick). One specimen, collected on December 19, is filled with spherical embryos, 0·036 mm. diameter, most of which are in a comparatively early stage of development. The most advanced stage, and one rarely met with in this specimen, shows a compact central mass of cells with a single epiblastic layer, and internally a few incipient acanthostyli 0·035–0·12 mm. long.

Plocamia gaussiana, Hentschel (Fig. 54 *e–i*). Several specimens contain embryos: those taken in December contain only a few aspiculous embryos (i.e. early stages); those taken in January contain numerous embryos in varying stages of development, but all, or nearly all, possessing spicules. From these, the course of development may be

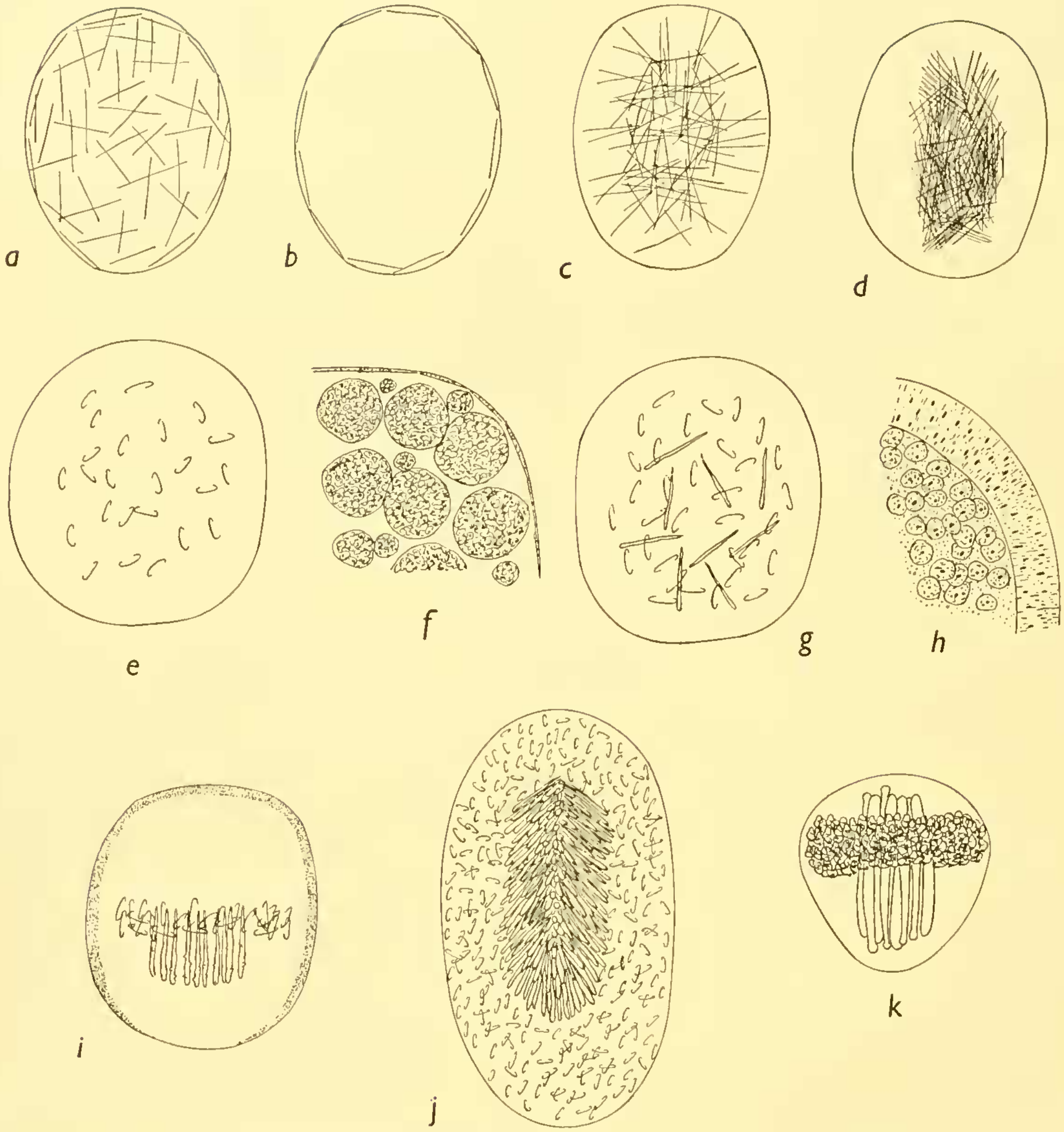

Fig. 54. Embryonic development in certain species of Tetraxonid sponges.

a–d, *Callyspongia flabellata*, sp.n.

a, embryo after first appearance of spicules; *b*, section of same, showing spicules in a tangential layer; *c*, spicules migrating inwards; *d*, latest stage observed. × 200.

e–i, *Plocamia gaussiana*, Hentschel.

e, embryo after first appearance of spicules; *f*, sector of same to show dermal epithelium and large granular cells of inner mass; *g*, first appearance of acanthostyli; *h*, sector of an embryo at a slightly later stage, showing columnar external layer; *i*, latest stage observed. *e*, *g*, *h* × 100, *f*, *h* × 250.

j, *Dictyociona discreta* (Thiele). The latest stage observed, with dense axial core of plumosely arranged acanthostyli. × 200.

k, *Asbestospluma calyx*, Hentschel. Embryo. × 160.

followed. The aspiculous embryos are spherical and attain a maximum diameter of 0·36 mm. and show an inner mass of large irregular cells with a thin layer of flattened cells on the outside. From this point a decrease in size takes place to 0·3 mm. diameter, the central mass becoming more compact and the outer layer being clearly marked off as a thick layer, 0·035 mm. thick, of columnar cells. At first the outer layer is of uniform thickness throughout. The first spicules to appear seem to be the chelae, which measure 0·026 mm. chord, as against 0·035 mm. in the adult, but do not otherwise present any peculiarities. They are scattered evenly through the central mass of cells. Small acanthostyli, 0·07 mm. long and differing considerably from those of the adult (cf. Fig. 54 *g*), then appear, also scattered through the substance of the central mass. A re-arrangement then takes place, the acanthostyli finally being found in a bundle at the centre of the embryo and towards one pole, their apices centrifugally directed, with the chelae in a diffuse corona around the inner end of the bundle. At the same time, the outer layer of columnar cells becomes much thinner near the outwardly directed bases of the acanthostyli (Fig. 54 *i*). This may, by analogy, be regarded as the aboral pole.

The specimens recorded by me (1929, p. 435) from McMurdo Sound, taken in February, contain large aspiculous embryos.

Dictyociona discreta (Thiele) (Fig. 54 *j*). One specimen, collected in March, contains aspiculous embryos only, but a second specimen, collected in April, has a few spherical embryos, 0·32 mm. diameter, containing rare, almost indefinable, acanthostyli, and numerous others 0·25 mm. diameter, with a layer of acanthostyli measuring 0·07 by 0·002 mm. The acanthostyli are all lying tangentially to and just beneath the surface of the embryo. In a third specimen, collected in July, a single embryo was found containing numerous acanthostyli, arranged in a dense bundle at the centre, and numerous chelae of 0·008 mm. chord (cf. the oxea in *Callyspongia flabellata*, sp.n., Fig. 54 *d*).

Eurypon miniaceum, Thiele. Collected in October, contains ova and very young embryos.

Hymedesmia irritans, Thiele. A single specimen, collected at Tristan da Cunha on February 1, contains spherical embryos, aspiculous, measuring 0·16 mm. in diameter.

Hymeniacidon sanguinea (Grant). One specimen, collected on July 28 from Angola, contains numerous embryos up to 0·2 mm. in diameter. Most of the embryos are aspiculous, but some contain styli, with faintly irregular surfaces, measuring 0·12 by 0·003 mm. These spicules are at first arranged tangentially to the surface, but later migrate inwards to lie in a confused mass towards the aboral (?) pole with their apices directed towards the centre of the embryo.

Hymeniacidon dubia, sp.n., collected in March, contains ova and very young embryos.

Plicatellopsis flabellata, sp.n. The specimen, collected on June 22, contains a few oval embryos, 0·07–0·1 mm. in longest diameter, in early stages of development.

Stylocordyla borealis (Lovén), subsp. *acuata* (Kirkpatrick). A single specimen, collected on December 15, contains numerous embryos in an advanced stage of development and a few that are entirely aspiculous. Embryos have been found in the Terra

Nova specimens of this subspecies in January, and in the Challenger specimens of the subspecies *globosa*, also in January.

Polymastia isidis, Thiele. One specimen, collected on July 17, contains numerous sperm morulae, 0·045 mm. in diameter, in the inner tissues, and indications near the surface that budding was about to begin. Around the outer ends of the bundles of the main skeleton are gathered masses of cells of a peculiarly yellow and granular appearance, and if we may judge from Eichenauer's (1915) work on *Tethya maza*, Selenka, these are groups of amoebocytes (? archaeocytes) which will eventually form the bulk of the substance of the buds.

Sphaerotylus antarcticus, Kirkpatrick. Very young specimens are recorded by Kirkpatrick (1908, p. 17) which were collected in January, June and September respectively,

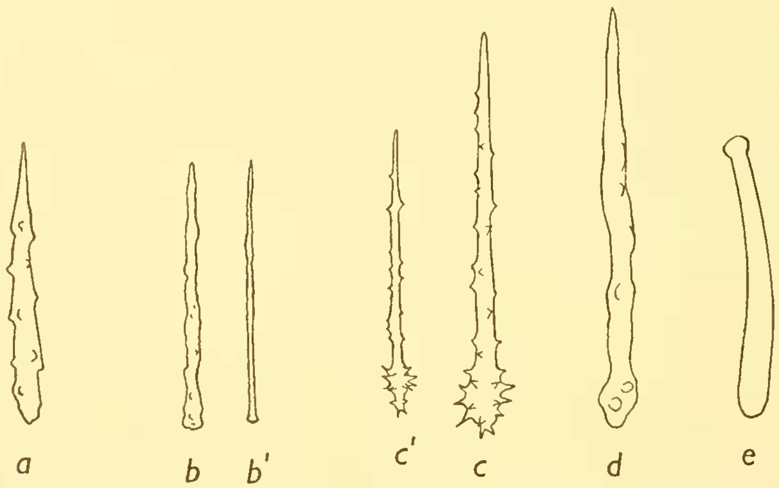

Fig. 55. Embryonal megascleres of *a*, *Plocamia gaussiana*, Hentschel; *b*, *Dictyociona discreta* (Thiele); *c*, *Anchinoë leptochela* (Hentschel); *d*, *Kirkpatrickia variolosa* (Kirkpatrick); *e*, *Asbestopluma calyx*, Hentschel. All × 500, except *e*, which is × 400 (*b'* and *c'* are developmental stages).

and as these young specimens were approximately of the same size, it is probable that some form of reproduction goes on in this species all the year round. This is probably an asexual budding. *S. schoenus*, Sollas, was also recorded by the same author to be actively budding in January.

Spongia magellanica, Thiele. A specimen, collected on March 24, contains a number of spherical embryos, 0·07 mm. in diameter, showing a marked similarity to those of *Hircinia variabilis*, var. *flavescens*, figured by Schulze (1879, pl. iii, fig. 1), and especially to the one in the bottom left-hand corner of the figure. A clear area, spherical in outline, is readily discernible at one pole of the embryo. The embryos are found chiefly on or near the principal fibres of the skeleton.

POST-LARVAL DEVELOPMENT

Tetilla leptoderma (Sollas). There is a single small specimen from St. WS 27 which measures 3 mm. in diameter. The skeleton consists of radiating bundles of oxea, pro- and anatriaenes, which start from an excentrically placed nucleus. The form of the spicules is the same as in the adult, but the size is considerably less. The interesting feature about this sponge is that the small cortical oxea, instead of being set more or less at right angles to the surface, as in the adult, are arranged in a tangential layer at the surface.

BREEDING SEASONS

In the table given below, the evidence obtained from the finding of embryos *in situ*, based on the records of previous authors and the results of the present study, is brought

Table showing the approximate breeding periods of Antarctic species of sponges, as deduced from the finding of ova or embryos.

Species	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Calcarea												
Achramorpha nivalis, Jenkin						—	—	—	—	······	······	······
Tenthrenodes scotti, Jenkin						······	······	—	······			
Megapogon raripilis, Jenkin						—	—	—	—	······	······	
Leucetta leptoraphis (Poléjaeff)	—	······	······								······	······
Tetraxonida												
Oscarella lobularis (Schmidt)								······	······	—	—	······
Plakina monolopha, Schulze	—	······	······								······	······
P. trilopha, Schulze	—	—	—	—								—
Craniella leptoderma (Sollas)	······				······	······	······	······	······	······	······	······
Cinachyra barbata, Sollas												
C. antarctica (Carter)												
Haliclona bilamellata, sp.n.			····	—	······	······	······					
Petrosia fistulata, Kirkpatrick						······	······	—	—			
P. depellens, Topsent						······	······	—	······	······		
Adocia tremulus (Topsent)	······									······	······	—
Hemigellius rudis (Topsent)	······	—	······									······
Callyspongia flabellata, sp.n.	······	······	—	······								
Isodictya antarctica (Kirkpatrick)				····	······	—	······	····				
I. setifer (Topsent)	······	······	—	······						······	······	······
Guitarra fimbriata, Carter					···	······	—	······	···			
Mycale magellanica (Ridley)								····	—	······	······	······
Amphilectus fucorum (Johnston)	···	······	—	······	—	··						
Asbestopluma calyx, Hentschel	—	······								····	······	······
Tedania charcoti, Topsent	—	—	—	······						······	······	—
T. massa, Ridley and Dendy			··	······	—	—	—	—	······	··		
T. spinata (Ridley)												
T. murdochi, Topsent		····	—	—	—	—	—	······	··			
T. tenuicapitata, Ridley					······	······	—	······	··			
Iophon radiatus (Topsent)	······	—	—	—	—	—	······	······				
Myxilla australis (Topsent)			······	······	—	······	······					
Lissodendoryx innominata, Burton	······	······	······									—
Anchinoë latrunculioides (Ridley and Dendy)				···	······	—	······	···				
A. leptochela (Hentschel)		····	······	—	······	····						
Kirkpatrickia variolosa (Kirkpatrick)	······	······	···								······	—
Plocamia gaussiana, Hentschel	—	—	······								······	—
Crella crassa (Hentschel)	—	······							······	—	······	······
Dictyociona discreta (Thiele)	···	······	—	—	······							
Eurypon miniaceum, Thiele	······								······	—	······	······
Hymedesmia irritans, Thiele	······	—	······	······								
Dolichacantha macrodon, Hentschel								······	······	—	······	
Hymeniacidon dubia, sp.n.			—	······	······	······	······					
Plicatellopsis flabellata, sp.n.					······	—	······	······	······			
Stylocordyla borealis acuata (Kirkpatrick)	—	······								···	······	—
Polymastia isidis, Thiele						······	—	······	······	······		
Sphaerotylus antarcticus, Kirkpatrick	······	······	······	······	······	······	······	······	······	······	······	······
Euceratosa												
Halisarca dujardini, var. *magellanica*, Topsent	······	······	······									—
Spongia magellanica, Thiele	····	······	—	······	····							

Where a definite record for a given month has been obtained, a black line is used: a dotted line signifies the approximate period, based on the stage of development reached in the embryos.

together in an endeavour to determine the breeding seasons for sponges in the Antarctic. It is clear that the records are by no means sufficiently complete to be able to draw definite conclusions from such a table; but the tentative deductions are interesting. In the first place, there does not appear to be any part of the year during which a majority of species are in a state of reproduction. The table shows that so far as can be told from the available evidence some species are breeding at all times of the year; but, as none of the specimens investigated were littoral, there is perhaps little surprising in this. Secondly, there is an indication that all or most species of Calcarea breed throughout the year, for although the number of specimens examined is relatively small, the number of records of ova and embryos is comparatively high. This might be said of the Euceratosa also.

Comparison with the breeding seasons in the northern hemisphere is difficult, partly again because of the paucity of observations (many authors have described embryos but omitted to give the date when they were seen), and partly because the records here are mainly from littoral or shallow-water specimens, whereas the Antarctic records are mainly from deeper water (down to 500 m.). Nevertheless, we again find that the Euceratosa are in a state of reproduction throughout the year, and again a suggestion that the same may be true of the Calcarea (cf. *Sycon raphanus*, Schmidt; see table given below). Further, there is a marked breeding period from approximately May to October.

Table showing the approximate breeding seasons of the European and North Atlantic species of sponges.

Species	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Calcarea												
Sycon ciliatum (Fabricius)						——	——	——	······			
S. raphanus, Schmidt	——	——	——	——	——				——	——	——	
Grantia compressa (Carter)					——	——	——	——	······			
Leuconia aspera (Schmidt)			······	······	——	······						
Tetraxonida												
Oscarella lobularis (Schmidt)						——	——	——	——	——	——	
Haliclona oculata (Pallas)			······	······	······	——						
Mycale contarenii (Bowerbank)				······	——	——	······					
M. minima (Waller)				······	······	——	——	······				
Myxilla incrustans (Johnston)						······	······	······	——			
Hymedesmia dujardini, Johnston						······	······	······	——			
Halichondria panicea (Pallas)				——	——	——						
H. bowerbanki, Burton				······	······	······	——	——				
Hymeniacidon caruncula, Bowerbank				······	······	······	——	——				
Tethya aurantium, Pallas							——	——	······			
Cliona celata, Grant				——	——	——	——	——	——			
Euceratosa												
Spongia officinalis, Linnaeus	——	——	——	——	——	——	——	——	——	——	——	——
Hippospongia equina, Schmidt	——		——	——	——	——	——	——	——	——	——	——
Hircinia variabilis, Schulze	——	——	——	······					——	——	——	——
Halisarca dujardini, Johnston	——		——	——	——	——	——	——	——	——	——	——

In the one case, *Oscarella lobularis* (Schmidt), of a species common to the North Atlantic and the Antarctic (in which the breeding season is known) it is found that the same season is occupied in each locality. Thus, in the northern hemisphere, this species is, presumably, reproductively active from June to November, and in the Antarctic, from August to December.

UNATTACHED SPONGES

In discussing the possible means by which the distribution of sponges is effected (see p. 358), the assumption is usually made that there is no such thing as a free-living sponge capable of being transported in the adult stage by currents. Certain specimens of *Tedania tenuicapitata*, Ridley, in the present collections indicate the possibility that even adult sponges, often of large size, may pass their life floating just above the sea-floor, or at least resting unattached on the sea-bottom and capable of being lifted by currents of moderate force. This[1] may help to explain a number of anomalies previously observed in other species; and, in view of the importance of such observations as possibly affecting geographical distribution and the bionomics of sponges as a whole, it will be of interest to deal fully with the subject.

The sole means of observing sponges in the living state is confined to observation between tide marks, in aquaria, and in exceptionally favourable circumstances, with a diving helmet. In the first two, it is obvious that nothing in the nature of floating sponges can be observed, and in the third, the results of such investigations have never been recorded. It is necessary therefore to rely on indirect observation of preserved material.

Tedania tenuicapitata, Ridley, is represented in the present collections by some 200 specimens. Most of these are damaged or at least incomplete at the base, presumably where the trawl has torn them from the substratum. A few are, however, entire, and some of these show no visible sign of having been attached either to the sea-floor or to any such object as a hydroid or polyzoon. For the most part, such specimens are sub-spherical and of small size. There are, in addition, three discoid specimens which seem to offer convincing evidence in support of the suggestion that some sponges may not be permanently fixed to the substratum and, under favourable circumstances, slightly buoyant.

The first of these specimens (Fig. 56 *a*) is discoid, 16 cm. across, 12 cm. high and 3 cm. at the thickest point. The margin is even, and a cross-section in any direction shows a fairly regular ellipse (Fig. 56 *b*). At the base, the sponge is attached to the concave inner surface of a bivalve shell, and between the shell and the adjacent sponge tissue is a small quantity of sand. The margins of the sponge which encroach on the outer surface of the shell are, however, entire, without sand inclusions, and show no sign whatsoever of having at any time been attached to the substratum, rock, stone or hydroid, or of having been in contact with, or buried in sand. Further, there are several hydroids growing on the shell, and in each case these point downwards. The only possible assumption is that the sponge was free-living and, since it was obtained in a trawl, floating just above the floor of the sea.

[1] The idea is not novel, for Bowerbank (1866, p. 97) says of *Halicnemia patera*: "The habit of the sponge of including a small pebble in its centre, apparently as ballast, is very remarkable, and this is the only case in which there is an indication of a natural tendency to locomotion belonging to the adult species that I have ever observed among the Spongiadae".

The second specimen is even more convincing. This is more regularly discoid (Fig. 56 *c*), 21 cm. high by 17 cm. across by 3 cm. thick at the centre. The margin is entire throughout, with no sign of attachment, and the only inclusions are a few patches of sand at the centre and a small pebble embedded in the lower third (Fig. 56 *d*). Some hydroids are growing out from the surface of the sponge, and the direction in which they are pointing suggests that the sponge floated vertically (as figured) with the portion containing the pebble lowermost.

The third specimen has much the same shape and size as the second, but is entirely without large inclusions, shell or pebble. The margin is entire throughout, but at several widely separated points on it there is a peculiar roughening of the surface, suggesting incipient rooting processes, as though the sponge, although unattached, had at times come to rest on the sea-floor sufficiently long for rooting processes to start growing.

That there can be no question of these sponges having been erect, with their bases permanently embedded in sand,[1] can be proved from the following:

(i) Although members of the species readily take up sand (see below) these specimens are particularly free from it.

(ii) The tissues and skeleton are normal throughout the entire margin.

(iii) Flagellated chambers are present just beneath the surface throughout the margin. (Had these sponges been embedded in sand, it is unlikely that the flagellated chambers would have persisted in the submerged portions.)

With regard to the first point, the ease with which individuals of *Tedania tenuicapitata* will absorb sand grains is shown by the majority of the Discovery specimens. In some cases, the inclusions are confined to the base, which was presumably buried in the sand, but in most cases sand is found throughout the specimen (Fig. 56 *g*). Fig. 56 *e* shows a section of a flabellate specimen with a sandy base, and Fig. 56 *f* shows an irregularly "table-shaped" sponge (spreading horizontally) with several "legs" which were buried in the sand at the base. In view of this therefore it is improbable that the margins of the discoid specimens could have been in contact with the "coarse brown sand" of the sea-floor without showing some trace of its inclusion.

It is noteworthy that both the discoid specimens, when immersed in 80 per cent. alcohol, only just sink. That is to say, they will sink, but the slightest touch on the under surface, when the specimens are standing erect, will cause them to rise in the spirit. This feature is more strongly marked than in any other preserved sponge experimented with. Since the specific gravity of sea water is greater than that of alcohol, it is reasonable to suppose that these particular sponges would be unusually buoyant.

Other examples of sponges which may have floated above the sea-floor may be easily found. The young of *Cinachyra barbata*, Sollas, for example, are sub-spherical (cf. Kirkpatrick, 1908, Plate ix, fig. 3), completely covered with a surface pile of spicules and showing no sign of having been attached; and the same may be said of adult specimens up to 10 cm. in diameter. Many specimens of *Thenea* show no evident point of attach-

[1] Coarse brown sand formed the substratum at Sts. WS 222 and WS 96 where these sponges were found.

ment, while *Cinachyra antarctica*, Carter, only rarely shows a basal tuft. In that species, the usual form is sub-spherical, with projecting tufts of spicules and numerous porocalices distributed evenly all over the surface (see Lendenfeld, 1907, Plate xxii, figs. 22–33, under *Cinachyra vertex*). Were such a sponge to lie on the sea-floor, some of the porocalices would be rendered useless, and would probably disappear as a consequence, and the ends of the spicule bundles would almost certainly be damaged. And further, the projecting spicules in the, supposedly, free sponges, as opposed to the rare examples of this species in which a basal tuft is present, are more markedly spiral in arrangement, suggesting that the sponge has been subject during development to a gentle rotary movement.

It is difficult to imagine *Disyringa dissimilis*, Sollas (Fig. 56 *i*), leading anything but a free existence, and it is interesting to compare this with the three known species of an allied genus, *Monosyringa*. The first of these, *M. longispinum* (Lendenfeld), is spherical with an oscular tube (Fig. 56 *k*) and the body is covered with delicate sucker-like processes. In this species there is no sign of attachment and the processes are all free, but in *M. mortenseni*, Brøndsted and *M. brondstedi*, Burton, the known individuals, identical in external form with *M. longispinum* (Lendenfeld), are covered with pebbles and calcareous debris, each pebble or fragment being attached to the sponge body by one or more of the sucker-like processes (Fig. 56 *l*). Presumably, as there is no evidence of other point of attachment, these species may be free-living or may attach themselves to numerous small bodies which serve as anchors, or rather ballast.

In all probability, the species described by Ridley and Dendy (1887) as *Cladorhiza longipinna*,[1] *C. similis*, *C. inversa* and *Axoniderma mirabile* are also free-living forms. It is, at least, questionable whether the radiating processes would serve "to support the sponge in the soft mud on which it lies" (*loc. cit.*, p. 94). Rather would it appear that the shape here is an adaptation to a free-living existence, especially by analogy with *Crinorhiza* and certain Echinoderm larvae. The sponges of this genus are probably figured upside-down by Ridley and Dendy (cf. Fig. 56 *j*).

Another species which appears occasionally to be free-living is *Polymastia invaginata*, Kirkpatrick. In most cases, the individuals of this species are attached to stones of sufficient size to anchor them to the substratum, but in others there is reason to believe that, although a pebble is embedded in the base, the sponge actually floated above the level of the sea-floor. In a few individuals in the Terra Nova collections, there is no sign at all of attachment (Fig. 56 *n*), in others there is likewise no sign of attachment but a small pebble is present in the centre of the under surface (Fig. 56 *m*). This suggests that the larva originally settled on a pebble, but from the shape of the adult it seems unlikely that the sponge could have rested permanently on the bottom. The most illuminating specimen of this species is, however, one recorded by Kirkpatrick (1908),

[1] Topsent (*C.R. Acad. Sci. Paris*, CXXXIV, 1902, pp. 58–60) has advanced anatomical arguments for believing that the habitual poise of these species is contrary to that suggested by Ridley and Dendy. I, too, have found that no matter how the specimens be thrown into a liquid they quickly and invariably assume the orientation shown in Fig. 56 *j*.

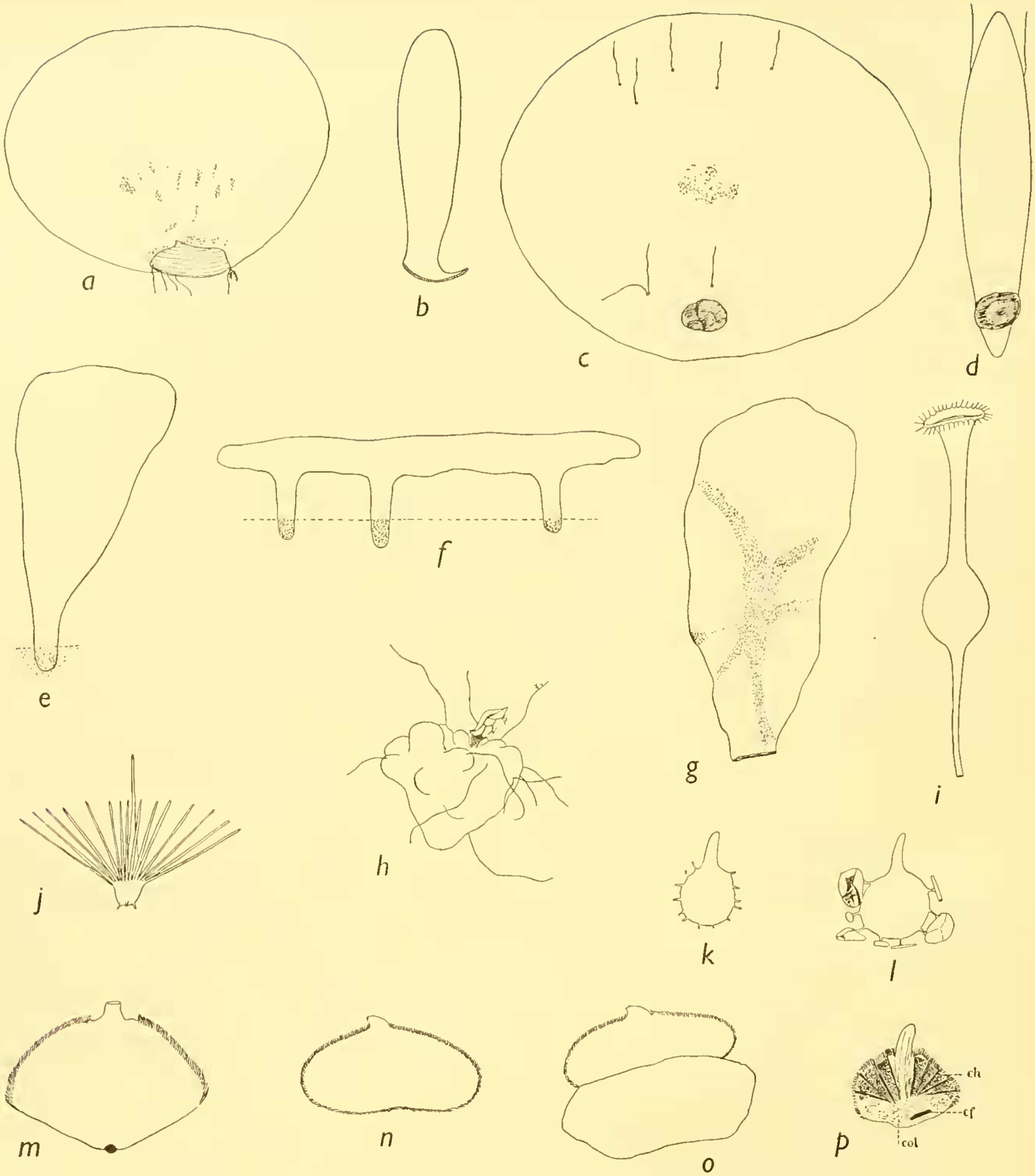

Fig. 56. Sponges with little or no attachment to the substratum.

a–h, *Tedania spinata* (Ridley).

a, a discoid specimen, with hydroids growing vertically downwards from the basal shell and small patches of included sand; *b*, section of same; *c*, a second discoid, with included pebble, hydroids growing out from the surface and included patch of sand at the centre; *d*, section of same; *e*, a flabellate specimen, showing method of attachment; *f*, a "table-shaped" specimen, showing method of attachment; *g*, section through a flabellate specimen, showing manner in which sand is taken up by the sponge; *h*, a sub-spherical specimen, bearing hydroids and a cirripede, from St. 222, taken in a tow-net. *a–g* $\times \frac{1}{3}$, *h* $\times \frac{1}{2}$.

i, *Disyringa dissimilis*, Sollas. $\times$ 1.

j, *Cladorhiza longipinna*, Ridley and Dendy, showing orientation. $\times$ 1.

k, *Monosyringa longispinum*, Lendenfeld, showing suckers.

l, *Monosyringa brondstedi*, Burton, showing suckers with attached pebbles, etc. $\times$ 1.

m–p, *Polymastia invaginata*, Kirkpatrick.

m, a (floating ?) specimen with a small pebble embedded in the base; *n*, a "free" specimen; *o*, a specimen seated on a rock; *p*, section through a young specimen, showing choanosome (*ch*), collenchymatous base (*col*) and included calcareous fragment (*cf*). *m–o* $\times \frac{1}{3}$, *p* $\times$ 2.

1 cm. in diameter, in which the lower (?) half of the sponge consists only of collenchymatous (gelatinoid) tissue completely enclosing fragments of calcareous debris (Fig. 56 *p*). The collenchymatous portion naturally suggests something in the nature of a float, with the fragments of debris acting as balancers.

Except for the species of *Cladorhiza* and *Axoniderma*, which may be habitually free-living, *Disyringa* and *Monosyringa*, which may be occasionally free-living, it is probable that the larvae first settle on small stones or pebbles, perhaps even large sand grains. If these be sufficiently heavy the sponge becomes attached for life; but if small, the growing sponge will gradually lift the stone or pebble on which it has settled, as their combined specific gravity decreases, and even, eventually, become grown round the stone or pebble, entirely enclosing it. In this connection it must be remembered that the specific gravity will vary from species to species, or from one individual to another of a single species, accordingly as the skeleton is slightly built or densely constructed, the relative quantities of spicules in individuals of a given species being subject to considerable fluctuation. It may, on the other hand, be argued that no organism with tissues charged with silica and devoid of appendages or special organs of flotation could possibly do anything else than remain permanently on the bottom. Yet, since the tissues of many sponges are densely charged with fat globules, and the spicules are not solid silex but contain an axial canal, it is possible that the specific gravity of sponges generally is less than is usually assumed.[1] The only real test worth applying would be specific gravity readings on the (apparently) unattached forms while still alive. One thing, at least, is clear, that many species of sponges are definitely free-living, and there is every indication that some of these at least may not rest permanently on the floor of the sea.

THE VALUE OF EXTERNAL FORM IN THE IDENTIFICATION OF SPONGES: WITH NOTES ON VARIATIONS IN THE SIZE AND SHAPE OF SPICULES

In the early days of the systematic study of sponges, external form was the only thing considered worthy of description. It was, in fact, not until after 1860, when Bowerbank and Schmidt published their well-known monographs, that the spicules were seriously considered as diagnostic features. In a very short time, the skeleton became the chief object for study by the systematist. To-day, considerably more attention is paid to the skeleton in the description of a new species than to the external form, and the tendency is rather towards omitting illustrations of the external form. As a result of my own experience, I am coming to the conclusion that, for the identification of species,

[1] I am indebted to members of the Discovery Staff, Dr Mackintosh and Mr Fraser, for the information that many specimens of *Tedania*, notably *T. massa*, emit large quantities of mucus when taken from the dredge. The presence within the tissues of large quantities of mucus would possibly result in lowering totally the specific gravity of the sponge as a whole, and it is conceivable that the texture and volume of a preserved specimen of *T. massa* differ appreciably from those of the living sponge.

external form is a more reliable feature than the skeleton; that it is more constant than the shape of the spicules, and far less variable, under normal conditions, than is usually assumed.[1] In addition far too little attention has been paid to the construction of the skeleton. In my opinion, the surest guide for the diagnosis of families is found in the types of spicules present; for genera, their arrangement and disposition in the skeleton, with minor variations in their shape; for species, the external form, with the minor variations in the arrangement of the spicules, and, less important, the categories of spicules present. In other words, the best method of identification lies between that adopted prior to 1860–70 and that which has been in use since.

Another practice which is to be deplored is that of founding species on badly damaged specimens, fragments of specimens and obviously pathological individuals (including those which occasionally replace their proper skeletons by sand or foreign spicules). Such objects, used as holotypes, give infinite trouble and rarely can their true characters be ascertained.

If, however, the skeleton is to be used in so important a role, it is at least time that some systematic effort were made to determine the extent of variation (i) in size, (ii) in shape, and (iii) in arrangement. Also, to collect data on the extent to which categories of spicules may disappear in individuals of a species, or be differentiated into two or more sizes. In studying the sponges collected by the Discovery expeditions, the following observations have been made and appear worthy of record:

Variation in the size of spicules

The first important observation on this point concerns *Calyx arcuarius* (Topsent). The oxea in the type measure 0·35 mm. long, in the specimens recorded by me (1929, p. 422), 0·27–0·35 mm., not 0·2–0·3 mm. as stated, in the present specimens of the Discovery, 0·22–0·24 mm., and in a specimen collected at South Georgia by Mr P. Stammwitz, 0·15 mm. long. The spicules of the last specimen are less than half the size of the maximum recorded.

In *Axociella flabellata* (Topsent) the large styli and dermal subtylostyli have a maximum of 1·0 and 0·650 mm. respectively, in the Terra Nova specimens and, in one of the present specimens, of 1·2 and 0·640 mm. In the other Discovery specimen and a specimen collected by the Shackleton-Rowett expedition, 0·64 and 0·35 mm. respectively. Again, the maxima recorded are twice the recorded minima.

In *Iophon proximum* (Ridley), the acanthostyli vary from 0·14 to 0·44 mm. (taking average sizes in different individuals), and the tornota from 0·14 to 0·315 mm.

It is clear from these examples alone that such phrases as "this species differs from... in the greater size of its spicules", are useless. *Ceteris paribus*, spicule size can have no

[1] Strong objection is here taken to the all too prevalent use of the term "amorphous" in describing the external form of sponges. The term has been used to include encrusting, massive, lobate, sub-digitate, clathrate and plicate sponges, and a number of combinations of two or more of these. The type of one of Lendenfeld's species of Australian Chalininae is a beach-worn sponge which has been, presumably, trodden under foot. This was described as "amorphous" and is the only truly amorphous sponge I have ever seen.

significance for the systematist, and it is only necessary to count the number of varieties, subspecies and species described in the literature devoted to Antarctic sponges, and founded on spicule size alone, to realize this.

Variation in the shape of spicules

The shape, too, of spicules is not so constant as is commonly supposed. It will vary more in one species than another, it is true, and from one stage in the life of an individual to another (cf. Burton, 1931), but in all species allowance must be made for these minor differences, instead, as has been the practice, of investing them with specific importance. A good example of this is given under *Iophon proximum* (Ridley) (see pp. 296–301), but the most striking case, which I hope to deal with in a forthcoming report, concerns *Clathria toxipraedita*, Topsent, in which the ornamentation of the acanthostyli, styli and dermal subtylostyli is very variable, while the general shape of these spicules also varies considerably.

The arrangement of the spicules in the skeleton is more constant than either their shape or size, but even here variations are found which can be very misleading. In appreciating the unreliability of the skeleton for systematic study, we are driven therefore to accept the external form of the sponge as the final and deciding criterion in its identification.

The suppression of microscleres

The dropping out of categories of spicules is a common phenomenon, but one which is not sufficiently appreciated. This seems to be particularly evident among the Mycaleae, but all types of sponges are liable to it. It is probable that sufficiently long searching would show that the apparently absent spicules will be found to exist, even though in minute quantities, in some parts of a sponge. That may or may not be true, but in any case the practical difficulty still remains. Apropos this point, there is a specimen of *Mycale magellanica* in the present collection in which no spicules other than tylostyli could be found; yet the external form showed it clearly to belong to that species. I have myself described (1930, p. 333) as *Axinosia incrustans*, sp.n., a specimen which proved eventually to be an *Amphilectus fucorum* (Johnston) with very rare chelae. Most of the species of *Reniera* described by Dendy (1921) from the Indian Ocean contain rare sigmata, which may be found only after prolonged search. Numerous examples of this could be related (see also *Mycale magellanica*, p. 288), yet to suggest that microscleres are an unreliable criterion for taxonomic purposes is to make an unwelcome proposal. The fact is that they are secondary in importance to the structure of the main skeleton.

Differentiation within a single category of spicules

Thiele (1898, pp. 13–14) describes two species of *Stelletta* from Japan, *S. validissima* and *S. orientalis*, the former having oxea, dichotriaenes, protriaenes and two sorts of anatriaenes, the latter having oxea, dichotriaenes, protriaenes and only one sort of anatriaene. Both are from adjoining localities, have the same external appearance, and are, indeed, similar in all respects but the possession of two sorts of anatriaenes by the one species, and one sort by the second species. It seems unreasonable to doubt that the two species are identical, but for this it must be presupposed that any category of spicule is capable of differentiation into two sizes. A striking example of this is found in *Craniella disigma*, Topsent (1904, p. 100), which differs from *Tetilla cranium* (Müller) Autt., in one respect only, that it has two sizes of sigmata instead of one. Here, again, it seemed probable that *Craniella disigma* was identical with *Tetilla cranium*. To test this I took a jar from the Porcupine collection, containing some thirty specimens identified by Carter as *Cranilla cranium* (Müller). Only one had been previously cut. The specimens were all alike externally and proved, on being sectioned, to be all alike internally; one of them, however, had two sizes of sigmata, exactly as in *C. disigma*, Topsent. Further, *Clathria frondifera*, var. *dichela*, Hentschel (1912), is probably a specimen of *C. frondifera* (Bowerbank) in which a similar differentiation has taken place.

Taking, now, all the variations to which the skeleton may be subject, it is not unreasonable to suggest that the external form may conceivably offer a more reliable means of identification, if only as the final arbiter.

THE ABUNDANCE OF SPONGES IN THE ANTARCTIC AND ITS GEOLOGICAL SIGNIFICANCE

According to Prestwich (*Geology: Chemical, Physical and Stratigraphical*, 1886, p. 125), "in their geological relations the forms and distribution of the sponges are of the highest interest". This being so it would be as well to be sure that the statements upon which geological arguments are based are correct. Merely a superficial acquaintance with geological literature is sufficient to show that this is not always the case. There is, for example, a strong belief among geologists, as shown by the literature, that the growth of sponges is most prolific in warm seas, and that, *a priori*, a deposit rich in sponge remains must have been laid down in a warm sea. The abundance of sponges in the Antarctic, as shown by the present collections, definitely proves that in recent times at all events this is not the case. Judging by the collections and by the verbal accounts of collectors, there is every reason to believe that sponges are at least as abundant in the Antarctic as in, say, the West Indies, Australia or the Indian Ocean. And the probability is that they are considerably more abundant. Certainly, the average size of the specimens exceeds that observed in any other part of the world. And finally, what is even more important from the geological point of view, whereas a large percentage of the sponges in warmer seas are keratose or pseudokeratose, the remains of which are unlikely to be preserved in a fossil state, those of the colder waters are almost exclusively siliceous, and the spongin, when present, does not form so great a percentage of the skeleton as in corresponding species in the warmer seas.

There is, further, the belief that sponges reached their "maximum development in the Cretaceous period". Again there is no evidence to support this. Neither in the complexity of the skeleton, the size of the spicules, the size of individual sponges, nor in the diversity of species, even when allowance be made for the fact that many species living in Cretaceous times are as yet unrepresented in our collections, can the Cretaceous fauna be said to have reached a degree of development greater than that represented by the sponges of the Antarctic to-day, or, for that matter, any other quarter of the globe.

And, finally, there is the question of the segregation of silica in the sea, in relation to the formation of chert and flint. Some geologists find it difficult to believe that the vast quantities of silica contributed annually to the sea by rivers (320,000,000 metric tons) can all be accounted for by the silica deposited as animal skeletons,[1] even allowing for a small percentage known to be deposited in a colloidal state in the normal course of sedimentation. Judging by the sponge fauna of the European or American coasts, there is doubtless some ground for such doubt, but if the Antarctic be considered too the case assumes a different aspect. Here, in a vast expanse of ocean, with the erosive forces calculated to contribute silica to the sea reduced to a minimum, the growth of siliceous sponges is greater than in any other part of the world: and it can only be supposed that the supply of silica in this area is drawn from other quarters. Even more important, however, is the suggestion that, when it is considered how many siliceous sponges were collected by the Discovery expeditions at a relatively few pin-points of the Antarctic expanse, these 320,000,000 metric tons are probably barely sufficient to meet the demands of all silica-secreting organisms, sponges, radiolaria, etc. In fact, the assumption is more probable that, in addition, a fair proportion of the silica from the skeletons of dead sponges, and other organisms, may enter once again into circulation in the sea.

There is another point, from which no definite conclusions can be drawn, but the mention of which may be of interest. Among all the Antarctic collections represented in the British Museum, numerous examples may be found of accumulations of spicules into irregularly rounded masses, or balls (see Plate LVII, figs. 14–16). These are formed of the larger spicules of siliceous sponges, matted and felted together in compact masses up to 20 cm. in diameter: and their occurrence suggests that, indirectly, sponges may be the agents for a considerable amount of the segregation of silica necessary for the formation of chert and flint, in a manner hitherto unsuspected. There can be little doubt that these "spicule balls" are formed in much the same way as the balls of *Posidonia* fibres, by the action of waves, and it is probable that consideration of their presence in large numbers on the sea-bottom, taken in conjunction with the suggested continuous extrusion of sponge spicules during life (cf. Burton, *Proc. Zool. Soc. London*, 1931, p. 524) may be of importance in the study of cherts and their origin.

[1] See Tarr, Univ. Missouri Studies, 1926, Vol. 1, No. 2, p. 2.

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[Synonyms are indicated by italics.]